

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 1917.—VOL. XLII.]

LONDON, SATURDAY, MAY 18, 1872.

PRICE FIVEPENCE.
PER ANNUM, BY POST, £1 4s.

Original Correspondence.

THE SCOTCH IRON TRADE—No. IX.

THE CARNBROE IRONWORKS.

In the course of the series of articles of which this forms a part, the Ardeer and Glengarnock Ironworks have been fully described. The Carnbroe Works belong to the same proprietors, Messrs. Merry and Cuninghame, and were the first works of their kind which these well-known ironmasters projected, situated in the parish of Bothwell, about 1½ mile from Coatbridge. The Carnbroe Ironworks occupy a highly advantageous position on the south side of the Calder, a small but tortuous stream, to which they are indebted for an ample supply of water. Their facilities in regard to communication with the mineral fields from which the raw material is obtained are most complete, as they have direct access to the main lines of both the Caledonian and the North British Railway. They have also, by means of the Monkland Canal, ready access to the various ports in the South of Scotland, from which the pig-iron is transhipped to all parts of the world. A short line runs between the works and the Dundymuir station at Coatbridge, where Messrs. Merry and Cuninghame have a large depot on the banks of the canal; but the greater part of the iron is dispatched per rail to the Western ports.

The Carnbroe Ironworks were projected about the year 1838 by a company composed of three gentlemen. These were Mr. Alexander Wilson, who retired from the concern in 1844; Mr. James Merry, of Elladrum, M.P. for Falkirk burghs; and Mr. Alexander Cuninghame, father of the gentleman who now undertakes the active management of the works. Commencing with only four furnaces, the Carnbroe Works have since been extended to six furnaces, which for a number of years past, except when one of them required re-lining, or other repairs, have been in constant operation. None of the furnaces possess any novel feature. They are all built on the old-fashioned principle, with square bases, and archways leading into the tuyeres. Their average height is 40 ft. to the charging ports, the top of the furnace being 12 ft. higher. The internal diameter at the top of the furnace is 8 ft., the external diameter of the base being 23 ft. The furnaces, with two exceptions, are provided with eight tuyeres each. The tuyeres, which are all made at a foundry connected with the works, are 9 to 10 in. in length by 11 in. external diameter. Each furnace is provided with two heaters, and each heater is fitted up with 12 pipes, which are formed of the old horse-shoe pattern. Unlike the heaters of some other works in the Coatbridge district, those at Carnbroe are built by the side instead of at the back or front of the furnaces. The charge used is as follows:—For No. 1 brand, 16 cwt. of coal, 15 cwt. of char or ironstone, and 2 cwt. of limestone; and for No. 2 brand, 16 cwt. of coal to 14 cwt. of char, and 2 cwt. of limestone. The ironstone is chiefly brought from Oakley, in Fifeshire; from Garscadden, in Dumfriesshire; and from Milton, Lockart, and Carlisle, in Lanarkshire. It is also brought from Rochesoloch, near Airdrie, where Messrs. Merry and Cuninghame hold mineral leases of considerable extent. With reference to the coal, we may remark that it is brought from places equally remote. The company's leases on the Duke of Hamilton's estate, at Motherwell; on Lord Belhaven's grounds, at Haughhead, near Wishaw; and at Craig Neuk and Sunnyside, are all laid under subsidy for the supply of the Carnbroe Works. The chief source of the limestone supply is Milton Lockart, in Lanarkshire, where there are pits in which ironstone and lime are worked alternately. By private lines of their own, or by means of the main lines of the different railway companies, Messrs. Merry and Cuninghame have direct communication between their mineral fields and their extensive ironworks. We are indebted to the kindness of Mr. Cuninghame for an opportunity of inspecting the different works of the firm, and for the readiness with which every available information bearing upon their history or special features was placed at our disposal. To the same gentleman we are obliged for the means of ascertaining that the consumption of raw material at the Carnbroe Works for the six months ending Dec. 31 last was 47,418 tons of ironstone, 61,827 tons of coal, and 11,536 tons of limestone, being altogether 120,781 tons of mineral used in the course of the half-year. The consumption is now, if anything, above this immense quantity, the production of the furnaces being taxed to the utmost possible limits, in order to meet the pressing demand for the favourite Carnbroe brands. The conveyance of this large quantity of mineral is effected by the use of 740 colliery and other wagons belonging to the firm, and to remove the pig-iron from the works to the various depots or ports of transhipment three locomotives are in regular use, and sometimes four are required. Of this number one is regularly on duty during the night.

To return, however, to the mechanical appliances, of which we had for a moment lost sight. Blast is generated by three engines, two of them coupled, built on the beam principle, and occupying a spacious building, formed like an L, at the south-east corner of the works. One of these engines has been in use since the works started, in 1838, and was built by Messrs. Murdoch and Aitken, of Glasgow. The diameter of the blowing cylinder is 7 ft., that of the steam cylinder is 40 in., while the length of the piston stroke is 8 ft. It is a high-pressure engine, with four valves. The height of the blowing cylinder is 10 ft., and its diameter is 4 ft. The blast is carried from the blowing cylinder into the receiver by means of two monster pipes, 2 ft. in diameter, and not unlike the letter J as regards shape. The pair of coupled engines were only introduced about six years ago; they are the workmanship of Mr. Barclay, of Kilmarnock. The length of stroke is 7 ft., and the diameter of the blowing cylinder is 64 ft., that of the steam cylinder being 36 in. These engines are worked at a pressure of 34 lbs., and 18 revolutions per minute.

A plentiful supply of water is obtained from the Calder burn; it is pumped from the burn into a reservoir, about a quarter of a mile distant from the works, and from thence it gravitates to the furnaces and boilers. The water is lifted to the reservoirs by means of a plunger, worked off the single beam-engine.

Midway along the line of furnaces there is an elevator, built in the castellated style, and having a flagstaff in the centre. From the top of the elevator gangways branch off to each of the furnaces, and two engines, in a small building adjoining the foot of the elevator, are used to hoist the raw material. At either end of the row of fur-

naces there are two immense chimney stacks, each 150 ft. in height. Into one of these the smoke from the heaters is conducted by underground flues; into the other the smoke of the boilers is conducted by similar means.

The average production of the furnaces is 13 tons per shift, or 26 tons per twenty-four hours per furnace. Last year the total production of the works was upwards of 50,000 tons, which, assuming that the average price over the whole year was 80s. per ton, would yield a net revenue of over 200,000l. Upwards of 350 men are employed about the works, including the blast-furnaces, the foundry department, and an ironstone pit within the boundaries which the works properly comprise. The current rate of wages paid to the blast-furnacemen is as follows:—Keepers, 7s. 10d.; assistants, 5s. 3d.; and fillers 5s. 6d. per shift. Within the last month, these three classes of workmen have had an advance of one-halfpenny per ton at the Carnbroe Works.

It will be observed from what we have already said that the Carnbroe Works are rather behind hand in the matter of new processes and apparatus. This is principally due to the fact that the strong and stiffening demand during the last twelve months has taxed the productive capacity of the works so far as to prevent the possibility of laying off even one of the furnaces for the purposes of experiment or improvement. At Glengarnock, as we pointed out in a previous article, Messrs. Merry and Cuninghame have successfully dealt with the erstwhile difficult problem of utilising the furnace gases; and it is quite likely that the same principle of economy will soon be applied to the Carnbroe Works. But meanwhile the firm are not losing sight of other improvements. They are keeping a watchful eye upon the new gas furnace which Mr. Fernie is building at the Monkland Works, and should it realise all the expectations formed as to its advantages over the common furnace, it is on the cards to introduce the patent at Carnbroe, "when the fullness of the time has come."

In the foundry department at Carnbroe all the castings required for the furnaces and other parts of the establishment are made. Here, also, the wagons and locomotives are taken for the purposes of repairs. To facilitate the repair of rolling-stock a joiners' shop and a saw-mill are carried on in connection with the foundry. Gas is manufactured on the premises for the supply of the offices and the houses in the immediate neighbourhood. Their surplus stock of iron is stored by Messrs. Merry and Cuninghame on a piece of ground immediately adjoining the main line of the Caledonian Railway; but the stock is at present comparatively small, being only 8000 tons.

SILVER MINING IN AMERICA.

SIR,—In the Supplement to last week's Journal a general view of the subject was taken, both as to the formation and the yield of silver mines in America. Those who hold up their hands in astonishment, and almost lose their breath with surprise and incredulity, when a nominal capital of 1,000,000l. for a silver mine is mentioned, as in the case of the Emma Mine, of Utah, may be quieted by the fact mentioned of yields of mines amounting from 3,000,000l. to 45,000,000l., the names of which are given. It is proposed in this and succeeding articles to show what may be expected in the future of "Silver Mining in America," as the result of investing English capital with American enterprise, especially now that almost every element of uncertainty of cost of production is eliminated. In ante railroad times, when the mining regions were reached only by a sail to the Isthmus and thence to California, or by the more tedious and laborious trip across the uninhabited plains on wheels, thus unavoidably enhancing the cost of food and supplies to a point that of itself almost destroyed hope of profits; add to which total inexperience of first settlers in the entire subject of mining for the precious metals, and it is marvellous that any headway was made. Yet, behold the results! It is only about a score of years since the first discovery of gold in California, which led subsequently to the silver discoveries in the now State of Nevada, and the Territories of Utah, Colorado, Wyoming, Montana, and Idaho localities, that 20 years ago were almost exclusively in the hands of the Aborigines, but now occupied by something near nine hundred thousand hardy, thrifty, and enterprising people, whose industrial occupation is mining for the precious metals, and agriculture—pastoral and arable. In that time they have not only subjugated the wilderness, but have in addition practically mastered the subject of mining; and have, alone and unaided by outside capital, save only to a very small amount, brought their yearly production of gold and silver up to nearly 20,000,000l., which, unlike that amount of manufactures or agricultural produce, which makes a few exchanges and disappears, remains as a permanent addition to the wealth of the world.

Nevada thus far has been considered the great silver-producing State, more because of its famous Comstock lode, whose average yield for 12 years has been upwards of 2,000,000l., and because of more recently developed mines that are also becoming famous; as the Eureka Consolidated Company's mines, which has paid in the last 18 months nearly 400,000l. in dividends on a nominal capital of 200,000l., and without any working capital from the start. This company's mines were capitalised at 60,000l. in London and rejected. The Raymond and Ely Company's mines, which are yielding at the rate of 500,000l. per annum, are in Nevada, as also the Pioche and Meadow Valley Company's mine, all of which are becoming famous by their rich yields.

The Richmond Mine, owned by the Eureka Consolidated Company of California, and the Richmond Consolidated Company of London bid fair to rival the celebrated Comstock by its enormous yield of bullion. As already stated, the Eureka Consolidated has paid in the last 18 months 400,000l. in dividends, and those who know say that the Richmond Consolidated can pay that much in the next 12 months. If so, it unmistakably stamps the Richmond Mine as being second only to the Comstock. It is not to be wondered at that Nevada, containing such mines as those enumerated, should have such a silver reputation, and that its annual yield is attaining such immense proportions, fed as it is by the thousand little streams that flow from its lesser mines. But it has competitors for the front rank, and their claims will be stated in future articles. Let no one imagine, much less believe, that "Silver Mining in America" is simply a thing of the passing moment. Its vitalising influences are becoming apparent to all who think upon the subject. As a reliable in-

dustrial enterprise, it cannot be ignored much longer by the best financiers. X. X.

GOLD MINING IN COLORADO.

SIR,—The figures already given apparently prove the average value of 282 lodes in Gilpin County to be about \$35 per ton. Although this may be true of that number out of the many hundreds discovered, yet it is not a fact that all of the 282 lodes contain ore of that average value per ton. Quite a large number of the assays of samples from some lodes proved them to be worthless as mines. Had these assays been omitted in the calculation the average would have been larger than \$35 per ton. This fact being stated strengthens the presumption that this figure may be taken as the average value of workable mines with very great confidence. This average has been contrasted with the average value of ore raised in Australia, Brazil, and California, with great apparent advantage to Colorado. Hence the question very naturally arises, why is it that these ores have not been worked to a large profit, whereby the district would have gained a reputation unparalleled in gold production? A satisfactory answer would involve a history of the first treatment adopted, the after trials, troubles, and experiments in processes, the fruitless efforts and the immense losses sustained—a story too tedious, and now profitless, for your columns, profitless because a correct knowledge of the ores and methods of treatment have been gained. But a part of this answer very properly relates to the character of the mineral or vein matter, and the causes of loss when treated by stamps and battery amalgamation. To this some attention may be given with interest to your readers, especially to those who have had their minds influenced to the prejudice of Colorado gold mining.

Those familiar with the early facts connected with the discovery of gold in Colorado remember the wonderful productiveness of the placers and gulches, the richness of the surface rock, and the decomposed vein material found to considerable depths in the crevice of the lodes. It was the subsequent and sudden alteration in yield which confounded everyone, and whilst leaving all in perplexity as to the cause, produced the natural impression of poverty. A like experience had not followed the discovery of gold in California nor in Australia, the two leading districts of modern times. It was known that in these districts iron pyrites accompanied the vein matter to a limited extent, and at times caused inconvenience and loss, but there were few or no mines rendered unworkable by reason of excessive deposits of pyritic material. Difficulty on this account had been met, more injuriously, in the Appalachian gold fields of the Southern States, but it was then not understood nor appreciated. To a limited extent the same difficulty had been encountered in Brazil by the St. John del Rey Mining Company, which, with a pluck characteristic of English capitalists, triumphed over all difficulties, after expending two or more immense assessments in experiments and trials, profitable only because a correct method of working was finally established. Like difficulties had been experienced in the Ural, in Hungary, Piedmont, and elsewhere in vein mining, difficulties which had been surmounted by appropriate remedies, mainly mechanical, because the percentage of sulphurets was really small—an inconvenience rather than an obstacle to a purely mechanical method of reduction.

The vein matter, the mineral carrying gold in the lodes of Gilpin County, was not quartz slightly interspersed with auriferous pyrites of iron, but rather auriferous pyrites of iron and copper, galena, blende, and sulphuret of silver, associated with quartz, porphyry, sienite, &c. After the decomposed vein matter had been removed (readily worked in the stamp mill) this sulphuretted matter was encountered in vertical seams—at one place thin and numerous, then running together, forming a vein of 2, 3, and at times 4 ft. in width of solid mineral, the components of which were the metals and sulphur almost free of gangue. The bulk of crevice matter held these sulphurets mingled with the gangue to a large extent, fully 20 per cent. on the average. A like occurrence had not been met elsewhere. The workable mines of California do not contain an average of 3 per cent., nor do those of the other districts mentioned, as a general thing. The Eureka of Grass Valley, a representative mine of California, recovers about 1½ per cent. of simple auriferous iron pyrites by concentration—there is no 20 per cent. of iron and copper pyrites, galena, blende, and sulphide of silver, as in Gilpin County. There the stamp mill, followed by mechanical devices for amalgamation, secures very nearly all the gold; here a copy of the same devices would permit nearly all the gold and silver to pass away with the pulp. Yet the Californian and Australian devices for milling and amalgamation were the only ones known, and hence were used in Colorado, and are yet upon mill ore, since the erection of smelting works for what can be hand-selected out. When skill and thorough care is used, perhaps 40 per cent. is saved by the mill, as has been stated, at a working expense which should cover a close yield of the total contents, hence what would be a very large profit on the industry is allowed to pass off in the waste.

THE RELATION OF SILVER TO GOLD.

This relation was unnoticed until attention was directed to its importance by your correspondent. As an alloy silver is never absent, but until these ores were handled mines producing gold ores seldom or never produced the sulphides of silver in appreciable quantities. Such ores are unknown in California, and no mention is made of the sulphide of silver existing in the gold-bearing rocks of Australia. Nor is the presence of copper notable in either of these regions, whereas in the Gilpin County auriferous veins the sulphide of silver is an important element of value, as is also copper. It is, perhaps, sufficiently curious to remark that this sulphide of silver accompanies the mineral when distributed throughout the gangue (in mill ore) to a greater extent than it exists in the solid pyrites (smelting ore) from the same vein, as will be seen from the following figures:—

428 assays of mill ore made during two years—samples Gold.	
from 282 lodes	\$22-58
Here \$100 in gold carries \$77-68 in silver.	\$17-61
216 assays of 1st class (smelting ore)	97-56
Here \$100 in gold carries \$34-26 in silver.	33-43
78 assays of ore—the poorest mill ore taken out	61-15
Here \$100 in gold carries \$70-84 in silver.	43-94

By taking the average of these 712 assays, representatives of all the ores raised during two years, we have the relation of \$57-58 in silver to every \$100 in gold. The average alloy of gold and silver, where gold is found native, throughout the world is about \$21 in silver to \$100 in gold. The alloy of bullion produced by the mills of Gilpin

County is about \$20 in silver to every \$100 in gold. Hence the mills get only the native alloyage; all other silver in the ore escapes amalgamation, and is lost if not caught with the tailings. At the mill ore average that loss would be \$57.65 in silver gone off for every \$100 of gold contents of the ore. By the average, that loss would be \$37.58 gone off for every \$100 of gold contents of the ore. But since in many cases the tailings are stopped, piled up, and afterwards buddled (concentrated), another element must be taken into consideration.

220 assays of tailings (samples taken during two years from several piles representing very many thousands of tons of original ore) show Gold, \$34.92 Silver, \$8.88 Here \$100 gold carries \$25.43 silver.

Now, if there had been no sulphide, the gold in the tailings should show the same relation in silver as in the original ore, which was \$77.65 in mill ore, or \$57.58 averaged, to the \$100 in gold. Hence a loss in silver, on the average, of \$32.15 to every \$100 of gold yet remaining in the tailings. This loss represents the loss of silver (sulphuretted) at the mill flow, the sulphuretted being exceedingly friable and easily carried off in the water as slum, and may be stated briefly. For every \$100 in gold put in the tailings \$32.15 in silver have gone off irrecoverably in the flow of the mill. Now, since at least 40 per cent of the gold in \$35 ore is thus sent to the pile of tailings, the loss of silver may be calculated. But the loss of silver does not stop here. These tailings have now to be buddled (concentrated), whereby another loss of the sulphide is brought about.

In 132 assays of concentrated tailings (representing the result of buddling very many thousands of tons of mill tailings) the relation of silver was found to be \$8.53 to \$49.42 in gold. Here \$100 in gold carries only \$17.51; a change in buddling from the average of \$25.43 to \$17.51, a loss of \$7.92, or over 30 per cent.

LOSS OF GOLD BY MILLING.

The loss in gold occurs—1. By reason of the sulphates of iron and copper present in the water. Pure spring water changes blue litmus to red; the ore coming wet from the mine increases the strength of this solution, and since the same water passes through many mills, as well as absorbs sulphates from accumulating piles of tailings in the gulches, the water used in the batteries is really well impregnated with the sulphates. This cuts up and decomposes the mercury, which flows off with the pulp, carrying gold with it in suspension.—2. Ores pounded in connection with sulphurets and in sulphate water yield gold coated with a substance not soluble in mercury, hence free gold escapes amalgamation and flows off in suspension.—3. Sulphurets enclose particles of gold, and unless completely released, such enclosed particles go off with the pulp, and if not caught among the tailings such gold is lost. Hence the loss of gold in milling such ores is inevitable. This loss may be set down as never less than 10 per cent, and may be very much more.

The next loss of gold occurs when the pile of tailings comes to be buddled. This loss will generally reach 25 per cent. of the gold—perhaps over 50 per cent. of the gold in the tailings. Tests have established this, and it is well known that a pile of tailings never produces a yield anything near the figure expected. Calculations involving a deal of figuring will develop a result somewhat like the following, the ore valued at \$35 per ton.

Roughly stated there are \$20 gold and \$15 silver.	
GOLD YIELD PER TON.	
In gold bullion, per ton of ore, by mill	\$ 8.00
In gold, left in concentrated tailings, by buddle	5.40
Yield of gold per ton	\$13.40
SILVER YIELD PER TON.	
Silver saved in alloyage with gold	\$ 2.68
Sulphide of silver saved by buddle	4.61
Yield of silver per ton	7.29
GOLD LOSS PER TON.	
Of the gold there has been lost in the flow	\$ 2.00
by the buddle	4.60
Gold loss per ton	6.60
SILVER LOSS PER TON.	
Silver has been lost in alloyage with gold—loss	\$ 1.32
lost as a sulphide by the buddle	1.97
lost as a sulphide in the flow of mill	4.42
Loss of silver per ton	7.71
Original value of the ore	\$35.00
The loss of gold \$6.60 per ton, or 33 per cent.	
The loss of silver \$7.71 per ton, or 52 per cent. nearly.	

A loss on the value of the ore of 41 per cent. after the expenditure of a manipulating cost more than sufficient to have covered a close saving of whole contents. A result equal to this can be assured only by the best conducted works on the stamp-mill and buddle system of working.—*Central City, April 25.* B.

ON THE FORMATION OF GOSSAN.

SIR,—At the beginning of this year a very interesting paper on Gossan was read at the Miners' Association of Cornwall and Devon, by Mr. W. Argall, and duly reported in the Journal of Feb. 10. It is not my intention to criticise that paper, but I may refer to it as the most complete in details that has yet come under my notice; and much credit is due to the author for having collected together a considerable number of valuable facts. It will be seen, however, on perusing it, and by the few other more or less scanty observations of other authors upon this subject, that the true nature of gossan, or rather its mode of formation, has hitherto escaped the most careful observers.

Perhaps some of your readers may remember a short letter of mine upon the minerals of the Utah district, which appeared not long since in your columns. In that letter, referring to some extraordinary specimens of ore examined in my laboratory in London whilst Prof. Silliman was investigating them in America, I was able to corroborate his statement that a most wonderful desulphurising agency had been at work after, or during, the production of these ores in Nature. So that, instead of meeting with sulphides of lead, copper, and silver in the usual form, we find only the residues of these sulphides intimately mixed with their products of oxidation and carbonisation. At the same time I said that I would refer at an early opportunity to the formation of gossan, which, in my opinion, has evidently originated in a very similar manner.

Those who have mines in Cornwall, as well as in other parts of Europe where metalliferous veins are abundant, are well aware that spathic iron (carbonate of protoxide of iron) is a constant portion of the gangue in some of the most valuable lodes, and that white quartz as invariably accompanies this spathic iron. Spathic iron and quartz constitute the gangue of some of the most important copper and silver ores; and it has been my good fortune to trace the Cornish gossan directly to the spathic iron, both in the neighbourhood of Lostwithiel and in the Callington district, where the transition is often so exceedingly gradual that it is almost impossible not to perceive that the one has been formed at the expense of the other. This occurred in the early part of the year 1862, and ever since my opinion of the nature and formation of gossan has remained unshaken. Gossan is formed by the weathering of lodes consisting largely of spathic iron and quartz; but this weathering may have occurred under peculiar circumstances, and the result may have been hastened or extended in early ages by the action of aqueous vapour, in the form of superheated steam; and, in the case of the Utah ores, to this agency has doubtless been added powerful currents of carbonic acid gas.

Anyone who has perused the results of the experiments made formerly by my ingenious friend, Prof. Daubrée, member of the French Institute, will certainly have been struck by the great part which superheated steam has evidently played in the formation of crystalline minerals; but in the case of gossan it may not have required more than currents of warm moist air to effect the complete weathering of large masses of spathic iron in a comparatively short time, to transform it from a hard crystalline mass to a powdery soft mineral, whilst it changed in composition from carbonate of protoxide of iron into a hydrate of peroxide, losing its carbonic acid, and absorbing oxygen and water. Showers of rain, or streams of water, would easily carry off some of this newly-formed substance (hydrate of peroxide of iron), and leave the quartz more or less cellular, its cavities being lined, or partially filled, with this hydrate of peroxide of iron, just as we find them at the present time. The same action may still be seen in operation on many points of the earth's surface, though certainly on a much less extensive scale, than formerly.

It will easily be seen from this of what importance it is to the explorer of mines and mining districts to possess accurate analyses of gossans, for whatever metallic substances are found in such analyses

are sure to be met with more or less abundantly in depth. For instance, we know by long experience that spathic iron and quartz form a very considerable portion of the gangues of tetrahedrite, or grey copper ore, copper glance, ruby and black silver ores, copper pyrites, and sometimes of blende, arsenical pyrites, tinstone, and a few other less important minerals. And though it often occurs that no mineral of value can be detected in gossan by the eye alone, a careful chemical analysis will show what may be expected in the lode at a little depth. I recollect being requested, many years ago, to make a careful chemical examination of some Cornish gossan from a property recently purchased, in which stones no metallic ore whatever could be discerned, even with the aid of a microscope. The analysis, nevertheless, showed 13 ozs. of silver to the ton, and unmistakeable indications of copper, and I accordingly reported that both silver and copper ore would most certainly be met with in depth. Now, long before this mine had reached the 60 it yielded tetrahedrite ore, which in bulks of several hundred tons assayed 42 ozs. of silver, and from 5 to 8 per cent. of copper.

Another somewhat similar case was furnished me shortly afterwards by gossan which contained native silver in exceedingly fine threads, which could just be detected by means of a powerful lens. This gossan ran into the well-known quartz and spathic iron lode, giving fine bunches and veins of brittle silver ore. Not the slightest trace of copper could be detected in this gossan, but the analysis showed a minute quantity of antimony. Hence the conclusion that antimonial sulphide of silver was certain to be found, which soon afterwards proved to be the fact. I could quote several other more or less interesting cases of a similar nature if your space would allow it. As far as I am able to judge, gossan in Cornwall is more often connected with lodes bearing copper and silver than with other metals; but it is occasionally met with in the back of lodes containing galena, for instance, at the Phoenix Silver-lead Mine, and the presence of tin oxide in gossan may sometimes prove a very useful indication.

I trust I have shown how gossan originated in Nature. It is essentially a mixture of quartz and hydrated peroxide of iron, the latter being entirely derived from the spathic iron of the lode by oxidation and hydration, and the analysis of gossan has indicated in all cases that have come under my observation what minerals the lode would yield in depth—in other terms, what would be the nature of the mine.

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COAL MINING IN CAPE BRETON.

SIR,—Your correspondent, "J. R.," in referring to the coal mines of Cape Breton, says "the water seems to be the great thing to be encountered." This may be the case in the Sydney Mine, where the work is carried under the sea, and the dip of the seam is 1 in 3, but I think I may safely assert that it is not so in the inland portion of the Glace Bay district, traversed by the Glasgow and Cape Breton Railway, to which attention was called in a recent number of your Journal, where the dip is only 1 in 10. I visited this district last year, and at none of the collieries at work there did I observe indications of any great quantity of water. I went down the slope of the Block House Mine 1600 ft. to look at a little steam forcing-pump which was clearing the whole mine of water with a 6-inch suction pipe; and in the big pit of the Loryway Company, to which your correspondent refers as situated one mile from the Reserve, the water at 53 ft. was only 800 gallons an hour, and at 81 ft. 1700 gallons. This would be thought nothing of in England, being, I am told, frequently as much per minute.

Besides the mines of which your correspondent speaks, another company, the Emery, is being formed in London, to work the area between the Loryway and the Reserve. These three companies will be the first on the proposed line to Louisbourg, whence a large export trade may be expected, the harbour being free from ice throughout the entire winter.

T. F.

MINERAL WEALTH OF QUEENSLAND, AND MR. ANTHONY TROLLOPE.

SIR,—Great annoyance has been expressed here at the untruthful strictures of Mr. Trollope upon the mining, farming, and other producing interests of Queensland, and equally great surprise has been felt in this colony at the ready credence which has been accorded in England to the views of that gentleman, who cannot possibly know anything of the mineral lodes of Queensland, or, indeed, of any other country, I should fancy.

Leaving our farmers to speak for themselves (as they have already done rather freely as regards Mr. Trollope), I beg, as an old colonist, and well up in mineral matters, to set another view of the case before the English public. So far from being "exhausted," as Mr. Trollope says it is, our yield of gold has but lately commenced, and the earth is but little more than scratched as yet. Our first year of export was 1868, and we send to England yearly half a million of gold, the result of the labour of 3500 adult male diggers, or about 1500, a year each, an average which the world cannot parallel, and, being from rich matrix and not alluvial, the supply is practically inexhaustible.

For our copper, we have only one mine as yet in full work, and that one yields nearly a quarter of a million in pure copper yearly, and pays an annual dividend of eighty per cent. I allude to the Peak Downs Mine. This does not look like "exhaustion," does it? The other copper mine fully opened as yet—the Mount Perry—has, at an outlay of 18,000*l.*, exposed to view in its shafts and galleries 240,000*l.* worth of rich copper ore. Not a bad investment for the money! and by way of proof of it the shares have risen from 1*s.* each, the original selling price, to 42*s.* each in consequence.

We have hundreds of copper mines equally as good, and only wanting capital to develop them; and, to crown it all, we have discovered tin ore in fabulous quantities, scattered both in thick lodes and rich alluvial beds over a space equal to an English county on our southern border. The ore varies from 72 to 92 per cent. Such inferior matters as galena, or silver-lead, are quite neglected here in the face of so many better things, and lodes of pure galena 2 ft. thick are abandoned.

We in Queensland cannot understand why capitalists in England should take the opinion of Mr. Trollope in mining matters any more than a London publisher would consult a mining captain on a forthcoming novel before bringing it before the public. The solution of the action of Mr. Trollope is simple. Queensland is ruled by a high Tory sheep-farming clique, who dread the advent of population and mining progress for political reasons. Mr. Trollope dined with much of this sort of people, and he has written to suit them.

Brisbane, March 21.

N. BARTLEY.

ON WHAT DOES METALLIC MINING DEPEND FOR ITS SUCCESS GENERALLY?—No. II.

SIR,—To decide upon the most efficient, and at the same time the most economical, methods of developing metalliferous mines it is important to know at the outset in what group of rocks in the geological classification they are situated, as important differences so frequently occur in the lodes themselves on passing from one stratum into another that it requires, in order to efficiency of development, and the observance of a proper economy in the mode of working, radically different methods of procedure in the prosecution of the works, both primary and progressive. If such, then, is the physical condition and variation of lodes as affected by peculiarities of the rock formation, independently of the chemical changes, and the effects of such changes upon the lodes respectively, from laws which are in constant and unvarying operation, how indispensably necessary it must be to become acquainted with the geological peculiarities categorically of the different classes of rocks in which individual mines are situated. But whilst this branch of knowledge is of vast importance in its application to mining, it is by no means sufficient to ensure success in even a majority of cases, as is evidenced by the large number of unremunerative mines in the immediate vicinity of good ones. Situate precisely in the same classes of rocks, and characterised by the same general features, yet at the same time are affected and modified by local peculiarities, minor

ramifications of the great system of geology; and, therefore, something is necessary besides a general knowledge of even practical geology to guide the miner to successful issues in his individual enterprises.

I have already intimated that individual mines are largely affected by local influences, apart from the general geological outline. These local influences, affecting the success of mining, pertain to the intrusive rocks, and ordinary cross-courses, slides, and faults, and for aught I know, or can conceive to the contrary, the peculiarities of vein formations may be regulated by local laws also. It is, therefore, not enough that the general geological outline of a district should be well and satisfactorily understood, but its sectional, local, lineaments should be no less clearly comprehended and understood, and that they should be such as are usually conducive to metalliferous deposits of the most approved class.

All mining districts are characterised by some special, prominent, and distinguishing features, and these relate to the country rocks, lodes, cross-courses, slides, and dykes, including intrusive rocks, which have penetrated through the older formations. In respect to the country rocks, they supply the materials of which the lodes are formed, whatever their composition and character; and the size and direction of the lodes themselves are sometimes regulated by the class of rocks in which they are situated. For instance, lodes in the igneous rocks are seldom so large as those found in the stratified formations. Another feature of lodes in many districts is that the main lodes preserve a proximate parallelism to each other, and are very frequently conformable both in the direction and the degree of their dip. The peculiar features of the main lodes of almost all districts are in general at some one point or another sufficiently pronounced to enable the practical miner to determine with remarkable exactitude the result of their development, prolific or otherwise, in depth; and very frequently to foretell their greater or less capacity for productiveness or permanency. The intersection of metalliferous veins by oblique and transverse slides, and cross-courses, and dykes, of what nature and kind soever, has long been justly regarded with great favour by miners generally. I mean by miners experienced in and familiar with the phenomena of the rock and vein formations, and not that class of men which are found in every new mining country, and who call themselves miners because the profession is popular, and it is convenient to do so; and not only so, but because of that profound ignorance which sees nothing—peering into the darkness, and implicitly believing that it sees all that is.

I was told a short time since by a respectable merchant of this place that whilst in conversation with a gentleman a day or two previously, who recently arrived here from the State of New York to superintend the development of mines in which he had some interest, and who probably had never seen a mine previously, he (the merchant) was remarking on the nervous character of mining—mining in the true sense of the term—from the intricacies which beset especially its early stages, and the expenses incident during such stages to the acquisition of a satisfactory knowledge, even approximately, of their value. The new comer into the arena of mining replied, with all the promptitude, flippancy, and conceit of absolute ignorance, that one man could dig down into the ground as well as another. He seems to have been inspired to this effusion after witnessing the display, scientific or otherwise, of four sun-burnt miners in mining *tool-ology*—the whole of the force in his employ.

I have indulged in this digression, not because of its novelty as relating to mining on this coast, but because it is a fair sample of the current presumption concerning it throughout this region. The conclusion of all this is that "If ignorance be bliss, 'tis folly to be wise." To return, I was saying that the intersection of metalliferous veins by oblique and transverse slides, cross-courses, and dykes, of what nature and kind soever, has long been and justly regarded with great favour by miners generally, as necessary concomitants of all good mines. And hence their being so frequently adverted to in mining, and in mining reports, by all persons having any appreciable acquaintance with such pursuits.

A remarkably close resemblance may sometimes be observed between two districts, or two parts of the same district, in even a highly metalliferous zone, whilst at the same time a closer examination may reveal the fact that in their physiological characteristics they entirely differ from each other; and therefore, and because such altered conditions alter quality and results, it is necessary, to avoid deception and losses consequent thereon, to have recourse to more than one natural feature preliminary, and indeed progressively, prominent among which are the lodes themselves; for vain will be the fecundity of the rocks, locally considered, if no receptacles be provided for the deposition of their metalliferous products; and as it is highly probable that the process of metalliferous extraction is continually going on, it is reasonable to presume that if local fissures be wanting others more remote are had recourse to.

Passing from the consideration of the more prominent and distinguishing features of the rocks, and the veins situated therein, as to their mutual dependence on each other, and their natural adaptability to subserve the formation of metallic minerals, and the productive yield of the respective lodes, the process of their development, and the extraction of their products by skilful mining operations, merit the most serious attention. First, because the requisite mode of procedure in mining enterprises in many new districts, beyond a few generalities, may be without precedent; and, therefore, under such circumstances, if the science of practical mining—or, more properly speaking, the *genius* of practical mining—be absent, or ill understood, the course pursued will be dark, labyrinthine, and devious. And, secondly, because all demonstration in the exploratory parts of mining is experimental, and experiments in the solid rock are necessarily slow and expensive.

I suppose there is nothing which the practical miner has a stronger aversion to write about than practical mining, prescriptively, because of the necessary variations in its detail. There is just all the difference imaginable between descriptive mining and that which is purely prescriptive, as the latter to be effective must be directed to definite objects, *a priori*, and this cannot take place unless the objects be known, or supposed to be known. I have already intimated that knowledge to be positive in respect of such objects must be ocular; and I now add that that which is deduced by inference to be of value should be by the stern process of logic, from well-known and indisputable facts; and as it is clear that ocular knowledge cannot be acquired, except to a very limited extent, but by experimentation, so also it must be admitted that inferential knowledge, to be sufficiently reliable, must be referred analogically to experience as a standard; and hence, it is almost needless to say, we are brought into juxtaposition with the first object and the first duty of legitimate practical mining. And it is this in respect of individual mining sections, or sets, to ascertain the number of lodes available from one working centre, and the relative position of these to each other, and also the number, size, composition, dip, and direction longitudinally of the slides, flocks, and cross-courses, as well as of the dykes and other intrusive rocks by which the productive veins are intersected. It is not to be supposed that a knowledge of these facts can be arrived at without a preliminary outlay; and the mode of that outlay is, according to my judgment and experience, most effective and useful when made by adit explorations—that is, with the simple proviso that the merits of the ground are sufficiently pronounced to justify the outlay.

Works conducted in this way subserve many useful purposes, not only at the outset but always, by being incorporated into the general plan, even where no necessity exists for the discharge of water through such channels. If the adit and shaft system of working mines of gold, silver, copper, tin, lead, &c., subserve no other useful purpose besides that of ventilation, and the means it provides for the regulation and controul of such ventilation, and very frequently of increasing it, the pecuniary advantages of such a mode of working can scarcely be over-estimated, especially when a series of lodes are to be worked from one common centre.

I would not hazard the presumption of attempting anything more in connection with this subject than to refer in a general way to routine methods, and to signify approval of what experience teaches me is best. Another advantage of the adit exploratory system of lodes is that it enables the miner to select the most eligible and commanding site for a working, or man-engine, shaft—the most important as well as the most expensive item of mining. It is not too

much to say in this connection that the prosperity of many mines is marred, and the fate of many more sealed, by errors in this respect; therefore, the availability of the greatest number of lodes—consistent with the principles of a rigid economy—by the main or working shaft is of the utmost importance as affecting the prosperity of mines.

If a mine consists of but one lode, the adit and shaft system of working is preferable to any other, as the advantages under such circumstances are only less, at the utmost, in proportion to the number of the lodes, especially if the direction of the adit is towards the linear dip of the main shoot of ore in the lode; and most lodes, as is well known, are characterised by a definite linear dip of the ores they contain. But the question of ventilation in mines of the latter class is paramount, except where the adit is invaluable for the reception and outlet of surface water.

When the anatomy—I use the term considerably—of a mining section or sett is correctly understood, and the method of proceeding with the development clearly outlined and established, the detail at once becomes paramount, and includes nineteen-twentieths of the agent's duties. An enumeration of the more prominent of these may serve to show the qualifications which are necessary to constitute a person competent to undertake the duties of mine management; and on the amplitude and correctness of such qualifications the success of mining in a very eminent degree depends.

The proposition implied in the last paragraph will form the groundwork of my next and concluding communication upon this subject. *Ellsworth, Nye County, Nevada.* ROBT. KNAPP.

CAN THE CORNISH TIN STAMPS BE IMPROVED?

SIR,—I am much obliged to you for the insertion of my letters in your valuable Journal; they bring me enquiries daily, and requests from parties for me to go to their mines, or to meet them at some appointed place, to show my models. I have had to go West again for the past week, and others are requesting me to call at mines in Devon and Cornwall, but I am compelled to go to London, and, therefore, forced to delay seeing them. I shall be in town for the next three weeks, when I shall be prepared to meet tin mine secretaries, managers, or their agents, and show them my models, when they will be able to judge for themselves as to their merits after seeing four or five working, and such as I think must convince any sane man that Cornish men have hitherto been stamping on the dark side of the edge in every respect—that is, so far as stamping and washing tin goes.

I am convinced that a stamps on my principle can be erected for one-third the cost of the present drudge stamps, and do one-third more work. A stamps for the present day must be made—as Cornish men should—to conform to the times and imitate railway speed. I fear it may be said it is a disgrace to them to class their stamps with that dead drudge of an animal, the donkey; but they should know the difficulty they encounter if they attempt an increase of speed. Then let them discard their drudge donkey stamps, and bring out one that imitates that useful, and far more lively, animal the horse, that can be driven to suit the present age.

I believe that a stamps driven faster, with a lot of more lively heads in the stamps bed or cover, and of less weight, will do a deal more work than the old donkey stamps do, as that is an odd, ugly thing, pent up in a corner, with only a maximum speed, that cannot be increased; all they can do is to get more power, and add more weight. It is precisely the old motto, "We do as our fathers did before us;" but I can accommodate them with speed any way, either with large single rows of heads working on each side of the axle in single, double, or treble rows, or with fair-sized heads run with belts, 150 lifts per minute. I can suit them either way, and to do a deal more work.

They have another telling evil in the old stamps—it is not lively enough. Tin is a ponderous ore, and slow speed stamps give it time to settle between, and it is left under the heads until it is reduced to slime so fine that it is not to be caught with the crop tin, and it goes off in the stream; a portion is caught miles below, but a great deal goes into the sea. All letters addressed to me at 36, Hyde-street, New Cross, S.E., will find me. N. ENNOR.

N.B.—In my remarks on the cost of a stamps I refer to every portion except the heads and lifters; they cost much the same as in the old ones.

STAMPING OF CORNISH TIN ORES.

SIR,—An experiment of real interest to those interested in tin mines took place at Wheal Lucy, near Hayle, on Thursday, when Mr. Husband's improved Pneumatic Stamps, which has been perfected during the last 18 months, was fairly tested in the presence of several mine agents and gentlemen who had attended to witness the operations. Five tons 5 cwt. of blue elvan tinstuff, of the toughest and hardest nature that could be selected in the mine, or equal in hardness to any in the county, was carefully weighed out, and put into the stamps, which consists of two heads only, and in six hours this 5 tons 5 cwt. of stuff was all passed through the grates of a fair average size, being at the rate of 20 tons per 24 hours.

When it is borne in mind that from 15 cwt. to 1 ton of tinstuff per head per day is considered in the county very satisfactory working with the ordinary stamps, the importance of this result with the two heads will be apparent to all tin miners.

The driving power was obtained from a 20-in. cylinder single rotary engine, also employed for pumping from two shafts; the whole of the work was got through without the slightest necessity for urging the fires, even with a 7-ton boiler, from which it will be seen the new stamps will be found as economical as it appeared to be efficient. The construction of it is very simple, and can be erected for less than one-half of the cost of the old stamps; it can also be driven forward or backward, so that it can be worked by any kind of engine. It has been working here for four weeks, without let or hindrance of any kind, and I have no doubt the results of prolonged working will prove equally satisfactory, which will effect a revolution in the stamping department of tin mining, and it cannot fail, in my opinion, to be universally adopted.

A PRACTICAL MINER.

"SCIENCE OF INVESTMENT."

SIR,—The science of investment, to be faithful and useful to the pupil, should be searching, vigilant, and comprehensive; it should embrace security with healthy gains, a total absence of feverish impulse, with, on the contrary, an accurate analysis of facts, well understood and practically digested. Then, with earnest application, the pupil may lay out his capital with certain prospects of good and remunerative interest, and without fear of deterioration of principal. In October, 1869, I called attention to the following mines:—Bollack, Carn Brea, Cook's Kitchen, Dolcoath, East Basset, Great Wheal Vor, Herodsfoot, North Roskear, South Wheal Crofty, South Frances, Spearhead Moor, St. Ives Consols, Tincroft, Trumpet Consols, West Basset, West Frances, Wheal Kitty (St. Agnes), Wheal Margaret, Wheal Buller, and Wheal Grenville; and it is with satisfaction that I again address you in respect to these mines, as my predictions have been fully realised. Yet there are facts staring one in the face that induce me to qualify my recommendations 2½ years ago in regard to several of these properties.

In October, 1869, Bollack shares were worth 250*l.* each, and I recommended the purchase of 50 shares. The dividends have been 1*l.* in the interval, and the market value of shares is 230*l.* to 250*l.*, and requiring negotiation in realisation. This property is chiefly held by local capitalists. Carn Brea shares were 12*l.* 10*s.* per 1000th part, and the price is 180*l.* The change of management, and a more vigorous prosecution of the workings, effected what I advanced—instead of a lumbering old calling mine, a youthful and prospectively valuable dividend property. In the case of Cook's Kitchen, shares from 13*l.* 10*s.* have advanced to 56*l.* each, and the prospects of the future are good. It is of the first importance to the executive of this company to have the example right and left—i.e., Dolcoath and Tincroft—to spur them on to exertion, as it is all but certain that agents who could have worked a mine for 50 years without a single dividend would never have had the courage to sink shafts and to open out sections of lodes without a "link" to show them the way to mine. When I drew attention to this property the entirety was worth 33,000*l.*; it is now selling for 125,000*l.* Dolcoath is now worth

400,000*l.*, and in October, 1869, the value was 171,240*l.* At this price I advised purchases of shares, yet in the face of such an advance, notwithstanding dividends of 36*s.* 6*d.* have only been paid in the interim, I must suggest to my friends to allow Cornish holders of shares to retain them until a reaction in price transpires.

East Basset, in 1869, I thought of no value, and am still of the same opinion; calls have been made in the interval of time, and the price of shares has advanced from 1*l.* 5*s.* 12*d.* to 27*l.* Great Wheal Vor is a veteran of mighty strength; it is a source of profit to bankers, merchants, executives, and employees, and at the same time remunerates shareholders. The price of shares in October, 1869, was 14*l.*, and the value is now 11*l.*, dividends of 9*s.* 4*d.* having been declared over the period. Herodsfoot, in 1869, sold at 43*s.* per share, and the price is 45*s.* at the present date; I advised purchases of shares, and the dividends have been 1*l.* over the two and a half years. North Roskear, in October, 1869, I advised to be wound-up; no dividend has been declared for upwards of a quarter of a century; the shareholders have had only to respond to calls, and rest their hopes on the reports of interested executives. South Crofty, which unquestionably I advocated, from 12*l.* has advanced to 110*l.*, and the shares are mostly held by Cornish adventurers. I cannot see any reason why this property should sell for 120,000*l.*, whilst Providence, St. Ives Consols, South Caradon, Devon Great Consols, and many a valuable property, remain wholly neglected. South Frances, from 6*l.* has advanced to 67*l.* 10*s.* per 496th share, and West Basset from 7*l.* to 15*l.* per 6000th share; these two mines are still worth the attention of investors.

Spearhead Moor from 18*l.* has made no advance, yet the price is a bagatelle for the property, considering the prospects and value of machinery and plant—say, 4000*l.* for the entirety. Why should this property be so reduced, in face of 100,000*l.* for Penstruthal, or 70,000*l.* for Van Consols, to say naught of 185,000*l.* for an East Llangynog. St. Ives Consols, from 12*l.* per share, has advanced to 37*l.*, and the prospects of the adventure justifies my drawing special attention to its prospective merits. Tincroft is a wonder, and at the present price the shares are a sound and good investment. The mine is well handled, and its resources are being practically developed; and, from all that I can gather, there is no impediment which the energy and supervision of Capt. Teague cannot surmount in increasing the returns so as to give 100,000*l.* instead of 50,000*l.* annually. Trumpet Consols is a sound investment; it has been at work for above a quarter of a century, and is now paying 2000*l.* quarterly; the future is full of promise. Adjoining is a mine called Wheal Mount, the shares in which are selling at 11*l.* to 12*l.* per 1200th. The circumstances under which this property is introduced to the public lead me to anticipate a rapid advance in the price of shares, whilst the prospects are all that can be desired. All that is necessary is to open up the lodes, as their yield is already established.

West Frances from 44*l.* per 512th, has advanced to 37*l.* per 2048th share, and, as suggested in October, 1869, all have done well. Wheal Kitty (St. Agnes), from 5*l.*, advanced to 18*l.*; management good. Wheal Margaret, from 12*l.*, has risen to 27*l.* per share; this mine is likely to pay well at ruling quotations. Wheal Buller and Wheal Grenville were not favourites of mine in October, 1869, nor are they so to-day, therefore I do not desire to correct my opinion of their merits expressed two and a half years ago. The tables have been turned upon the London shareholders in Cornish tin mines, the shares are held by local capitalists; in fact, the absentees from the fortunate county have sold their shares; the local interests are strong, and every nerve will be strung to bolster up the several mines, so as to increase returns and gains, and thus induce London capitalists to embark again. If they, however, take my advice they will allow Cornish men to possess "One and All" for who but a gambler would embark in Dolcoath, Cook's Kitchen, East Pool, South Crofty, or West Frances at ruling prices, when the "Science of Investment" points to such properties as Turkish, Egyptian, and Italian Government Bonds, the Fore-street warehouse, various banks, canal, insurance, and other joint-stock companies, fully paid-up, that pay 10 to 12*l.*, and up to 15 per cent. interest, and with the minimum risks of loss?

R. TREDENNICK,

Consulting Mining Engineer.

3, Crown-court, Threadneedle-street, London, May 15.

MARKET VALUE OF MINES.

SIR,—A letter appeared in the Supplement to last week's Journal, headed "Market Value of Mines," which appears to me to be most inconsistent. "A Miner" has probably missed his market, and wishes to depress valuable properties, for an obvious purpose. Of the eleven mines to which he limits his kind enquiries most are revived concerns, originally started and to a great extent developed, when their tin ore was worth about 40*s.* per ton, but suspended owing to the low price. It appears to me that there is no class of adventure so safe to be remunerative as these. With tin ore at 100*l.* all the mines he names, and many others, must realise once immense profits. Prudent calculators would prefer them to the old deep mines for permanent investment. Many of the old mines are much troubled with water, and otherwise costly to work, 300 fms. below the surface of the earth, and of these many have not long recommended paying dividends. I think that comment is required on these facts. They certainly speak for themselves, and so will the mines by their results before this year is over. The value of a ton of the eleven mines in question some are selling as low as 6000*l.*, 8000*l.*, 15,000*l.*, and 20,000*l.* A CONSTANT READER.

MINING IN IRELAND—THE GLANDORE MINE.

SIR,—The person signing himself "Correspondent" makes some very erroneous assertions. As to it not being a place for copper, people making such statements ought to know well what they are talking about. The strata are congenial for that metal, and rich copper is there, and it is richest at the lowest point reached, and can be traced for 140 or 150 yards. Old Mr. Tonkin's opinion was that copper would be found in large quantities, and he hoped to live to see it worked for copper. There is abundance of manganese of excellent quality, and there is no falling off either in quality or quantity, but is waiting for proper appliances for getting and dressing. There is no pumping power but hand, and no dressing power but hand. The ore is better at the bottom than it was at the upper part. What has been sold has been dressed by hand; it fetched 58*s.* a ton in January, 1871. The market price of it is double what it was then. The directors undertook and are bound (if not legally, in honour) to provide pumping and dressing machinery, which is absolutely necessary before the mine can be worked. GLANDORE.

MINING IN IRELAND—THE GLANDORE MINE.

SIR,—I have noticed for several weeks past remarks from "Your Correspondent," and from Mr. Tonkin, respecting the Glandore Mine, "Your Correspondent" appearing to think that the representations made about the mine are, to say the least, extravagant, and Mr. Tonkin contending that, if not an El Dorado, it is a close resemblance to it.

As I happened to inspect the property since it passed from the possession of the former proprietor, I may be allowed to contribute my mite to the discussion. When I met Mr. Tonkin on the mine he appeared exceedingly sanguine, both as to present prospects and anticipated results—much more sanguine than I felt after my inspection. Still, I thought the property afforded a fair field for speculation, not so much on the ground of copper ore having been discovered as from the fact that a quantity of iron ore was laid open, and that the set contained such a large area of unwrought ground, from which good results in the shape of manganese and iron might be fairly looked for. The iron ore was represented to me to contain a certain percentage of metal, and to be valued for a certain sum of money per ton. I doubted both the one and the other. But I recommended a sum of money to be given for half the mine, contingent on those results being realised, but either the money I named was considered too small, or the results unattainable, or from some other cause, no arrangement was made, and even information I wanted was refused.

As regards the copper ore, some large detached rocks were to be seen, containing some rich copper; but the lode could not be seen. I gather from Mr. Tonkin's letters that the lode has since been discovered and sunk on; and, notwithstanding the opinion of "Your Correspondent," I think it quite possible copper ore may be met with, and in paying quantities. Still, if the iron ore contains 64 to 70 per cent. of iron, and 4 to 6 per cent. of manganese, I should prefer working it to exploring for copper ore.—*Bollina House, Killaloe, Ireland, May 8.* THOMAS KING.

MINING IN IRELAND—THE GLANDORE MINE.

SIR,—I did not intend to again trouble you with any further remarks upon "Your Correspondent's" fallacious statements, considering I had sufficiently refuted them, but as he has had the hardihood to repeat some of them in the Supplement of the Mining Journal of May 4, and appears to be like the man designated by a well-known author as the man who "being convinced against his will, remains of the same opinion still." The first question he now puts is—How many tons of copper ore were shipped, and what its value per ton? As it is no part of my duty to give such information to a stranger, much less to an anonymous correspondent, let him apply on these two points to the board of directors of the company in Manchester in his own proper name, and state that he doubts the truth of the statement that the copper ore is of high quality; he has been sold by them, being the produce of the Glandore Mine. If they consider his curiosity should be gratified let them reply to the third question. Let him also apply to the directors, and they will give him a satisfactory answer if they think proper to gratify his curiosity, not being a shareholder. To the second question, why does he limit it to 600 tons, and not allude to the 15,000 tons and upwards of manganese shipped and sold by the late Thomas Tonkin from this mine, or the 2000 tons manganese and 1000 tons iron ore shipped and sold from the mine since January, 1869?

4.—It is not true the late Mr. Thomas Tonkin ceased to work the mine because the ore was exhausted; for just prior to his decease he sold manganese at Liverpool, and sent upwards of 60 tons of iron ore to a smelting company at 22*s.* 6*d.* per ton on trial, and they then ordered 300 to 300 tons at the same price. But Mr. Tonkin's lamented decease at the time put a stop to all mining operations, which was not prior to the American War.

5.—The quotation from an old author made herein applies to this "doubt" of your correspondent. I will leave the reader to judge if a lode of manganese, up-

wards of 40 ft. in breadth, and traversing a length of 1½ mile in the mining sett, and from which lode near the surface the 15,000 tons of manganese, mentioned above, were taken, can be likely to be so exhausted, as when further opened upon manganese cannot be got from it in paying quantities. The same answer will apply to "Your Correspondent's" doubts as to the unwrought iron ore lode of 30 ft. broad and 1½ mile in the sett.

6, and lastly.—If the Glandore Mine is not "the right district for copper ore," how is it that the Great Cappagh Copper Mine, the Ballycunnish Copper Mine, the Skull Bay Copper Mine, and several others within a short distance from Glandore on the sea coast sent so many hundreds of tons of the richest copper ore to market, and as the Ticking Papers from Swansea and from Liverpool prove they do?

THOMAS TOSKIN, Superintendent of the Mine.

A REAL NUISANCE.

SIR,—Persons who have travelled over the West Cornwall Railway, by Pool Station, must have observed the large heaps of sand standing close to the line. These heaps are the debris brought from the stamping-mills of Carn Brea and Tincroft Mines. The sand composing them is so fine that during every storm the particles are carried a considerable distance, and deposited all along in the fields, gardens, roads, &c., in the direction of the wind, and rendering it very troublesome to people walking in the vicinity, the particles coming in contact with the eyes. These heaps occupy many acres of ground, are of great height, and contain, perhaps, millions of tons in weight. I know that to carry on the operations the debris must be placed somewhere, but the ground of complaint against the companies is because they do not take measures to stay the nuisance, which they might easily do by placing mud or turf over the sides of the heaps, to detain the sand, except at the points where the tram-wagons are now depositing the same. The residents, especially at Pool and neighbourhood, must be greatly inconvenienced by this sandfall, which enters into the houses as well as fields, &c. I am glad that I am not a resident. Hundreds of tons, I suppose, are annually so deposited, to the injury of the land as well as to persons. I do not know whether any law can be brought to bear upon the companies to compel a remedy, but whether there is or is not any legal power over them they ought, from a sense of public justice, to apply a remedy. R. B. Truro, May 12.

MINING IN CARDIGANSHIRE.

SIR,—On my return from the lead mines in the Devil's Bridge district, I was much pleased with the great improvement in the different parts of the Aberystwyth Lead Mine. The 36 in. level, which I have before alluded to (Penrhew) driving west, instead of the strong lode of mende is now almost destitute of this mineral, having given way to a splendid lode of rich silver-lead ore—just as I spoke of it in my former reports. This coming under the wind sinking from the level above will, by-and-by, open fine stopping backs of good length, easily to be taken away. There is also a great improvement in the eastern, or Bwlch Gwyn, Mine, which I consider sufficient inducement to any mining speculator throughout the kingdom. It gives one great pleasure to see those improvements upon property spoken so highly of, especially as I have from time to time, even from the commencement. I would, therefore, encourage the present shareholders (who are really fortunate in having taken up this rich property) to go on and prosper, as success is certain, so far as I am able to judge, having known the mines for nearly 30 years. Other mines in the neighbourhood are looking better all through the Pontnewydd mining district, from Phyllynion down to the western run of this part of Cardiganshire. I hope next week to speak of some of the mines in the Llanidloes district. SAMUEL TREVETHAN,

Mining and Consulting Engineer.

THE WADEBRIDGE DISTRICT.

SIR,—I am not surprised to see anything in your paper coming from Mr. Derry, but really, I did not think I should be brought on the carpet and challenged for lack of modesty for not correcting the impression conveyed to the public by a correspondent in the Journal of April 27, respecting the Paynton Iron Mines. I had no other motive when writing about the Paynton Mines in July but to try to start them for the benefit of the town and vicinity of Wadebridge, not through any selfish motive or desire, being always open to do good, whereas others are times endeavouring to come in and get the full benefit of other people's talent. I am not answering Mr. Derry's letter for opening up further correspondence, but merely to correct the erroneous impression it conveys.—*Wadebridge, May 15.* W. PAYNTER, JUN.

OLD TREBURGETT MINE.

SIR,—Since several of your readers have expressed surprise that none of the directors of the Old Treburgett Mine have informed them of what is going on at that mine, and its prospects, nor condescended to notice several letters which have lately appeared in the Journal of rather a personal nature, allow me to deal with the first part of the question—the second I do not think worthy of notice—and to direct the attention of shareholders to the report of Capt. Hancock, which appeared in the Journal of May 4, which, from my personal examination of the property yesterday, I can fully support. And more, I never saw Old Treburgett looking better, and I believe that Capt. Hancock, with his usual caution, has undervalued it at every point. I think there is no doubt that with the price obtained for the first-class lead ore—nearly 30*s.* per ton—the mine is not only capable of paying its way, but of returning dividends. The monthly sales will be at once increased, as a large amount of stopping ground is now being laid open. I strongly recommend my fellow-shareholders not to be induced by interested people to part with any of their shares, but rather to take any opportunity which offers itself to increase their stake in the property, even at a good premium, and of holding the same, as I feel certain the mine will turn out a lasting success. ALEX. BROWN, F.G.S. Truro, May 14.

BELOWDA HILL MINE.

SIR,—This mine is situated in the parish of Roche, and is in the hands of a very respectable proprietary, whose local representative and purser is Mr. Dunstan, of the Miners' Bank, St. Columb. The lodes are very numerous in the sett, and the stamperon elvan and dyke, worked on in Castle an Dinas, intersects it; but the company will, no doubt, devote their attention at present to the tin lode, which are more to be relied on. A deep cutting intersects several of the lodes, in which a tramway is laid down, to convey the tinstuff direct to the stamps. It is said by several mine agents that the stone composing the top of Belowda Hill yields tin in paying quantities, samples from numerous points having yielded that mineral. The whole surface has been disturbed by the "old men." When the stamping-mill has been at work two or three months on the stuff we shall be better able to judge of its quality on a large scale. R. S.

TERRAS MINE, AND ITS PROSPECTS.

SIR,—You gave me the privilege some months ago of expressing in the Journal my views of this mine, and of its growing prosperity. I have since inspected it several times, and have no hesitation in confirming my former statements. The elvan tinstone is now more productive than ever, and as the ore in Edward's and other lodes is now accessible at the 30, and will be so at the 40 within a short time, the yield of tin will unquestionably be more than doubled after the present time. I have, therefore, the utmost confidence in urging on my fellow-shareholders the advantage of holding their shares. The mine is economically worked and managed, and will in future pay handsome dividends. A NEW DIRECTOR.

ROSE UNITED MINES.

SIR,—When the late companies who worked Great North Downs and Wheal Rose determined to stop those mines much regret was expressed by the miners and others, because there was a decided conviction in their minds that they ought not to stop—the condition of the mines warranted a continuance of the works; Great North Downs especially, which was improving for tin at the time. I am one of the thousands who think that these mines united will pay well with tin at or near its present price, and, therefore, are much gratified to learn that a company has been organised to resume operations forthwith. Mr. Wm. Michell, of Cornhill, is the secretary; Mr. Henry Michell, of the Poldice and other mines, is the purser; and Capt. George Tremayne is the manager; all officers of established reputation, in whom capitalists may safely confide. The landowners are Sir F. M. Williams, Bart., Mr. J. M. Willard, and the others who have granted leases upon liberal conditions. I have heard that the set called East Downs has been added to Wheal Rose, thereby giving the company a more extended length on the course of the lodes, the length now being about 1½ mile from the eastern to the western extremities. The position of these mines is too well known to require description, and their former productiveness is taken as a guarantee for future success, all of them being comparatively shallow.—*Truro, May 15.* R. SYMONS.

THE EMMA MINE.

SIR,—Much has been said for and against this property; in my humble opinion a great deal too much, for, while I strongly deprecate the efforts of some of the "bear" operators, I cannot help thinking certain other parties are equally to blame for some of the statements they have circulated. I need only refer to the following, which appeared in the Journal of April 13, on the strength of which I was induced to largely increase my stake in the company:—"The directors will in a few days be in possession of the 183,000*l.* surplus reserve, which it was thought prudent to have in hand, and accordingly the dividend to be paid after May will be at the rate of 36 per cent. per annum instead of 18."

It now turns out, according to the statement of the Chairman at the meeting, that the actual cash assets at the present time are only equal to about three months' dividends, and that instead of the rate being increased the average returns of ore for the past six months have been insufficient by some 7000*l.* per month to meet the dividends already declared. I am aware there are extenuating circumstances, and that we may expect better results for the future; but, after all we have heard during the past few months, and especially the statement referred to above, one cannot help feeling a certain amount of disappointment. I also think it a great pity the directors did not boldly state at the time that the 1000 tons of ore "sold in Utah" never had any actual existence, but was a payment made by the vendors to make good their contract. I have no doubt a large number of the shareholders, like myself, looked upon it as a *bona fide* sale. F. T.

THE FLAGSTAFF MINE.

SIR,—My letter in the Journal of April 27, in reference to the present and prospective value of the Flagstaff Silver Mine, appears to have called forth a good deal of criticism from some of your contemporaries; and although some of them do not seem to place such a high value on it as I do, it is most gratifying to find them all characterising it as a splendid property. When I penned the remarks in question the price of the shares was about 12*l.* 10*s.*, they are now being largely sought after at 15*l.*, which would appear to be ample proof that the shares were then, and are still, very much below their real value. I have every reason to believe that the mine will turn out a second Emma, with this difference, that the capital of the one is considerably less than one-third that of the other, and besides there was more ore taken from the Emma previous to its becoming the property of the present company than would repay the entire capital of the Flagstaff twice over. While the amount raised from the Flagstaff prior to its coming into the possession of its present owners was very trifling, I again repeat that in well-informed quarters this mine is looked upon as equally valuable with the Emma. At the present price of the latter company's shares the property is worth a million and a half sterling. If, therefore, the produce of the Flagstaff should turn out to be anything like that of the Emma, the shares would be worth 50*l.* instead of 25*l.*, or 30*l.* New and valuable discoveries are being constantly made, and it is now evident that by the month of August the directors will be enabled to present the shareholders with a monthly dividend of 36 per cent. instead of 24, as at present. One most important feature of the Emma and Flagstaff Mines is this—the deeper they go the richer and more abundant the ore is proved to be. INVESTIGATOR.

[For remainder of Original Correspondence see to-day's Journal.]

ENGLISH CAPITAL IN OUR GRAVEL MINES.—The North America drift gravel claims, at Hepedam (Whisky diggings), Sierra county, containing 450 acres, have been sold recently in the London market to the "North America Gold Mining Company" (Limited) for \$400,000, including \$50,000 working capital. The purchase embraces the three groups of claims known as the North America, Niagara, and Vermont, lying contiguous in the ridge dividing the counties of Sierra and Plumas. They are well opened, and prove to be properties of great

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SPECIALLY RECOMMENDED FOR LOCOMOTIVES, being completely soluble
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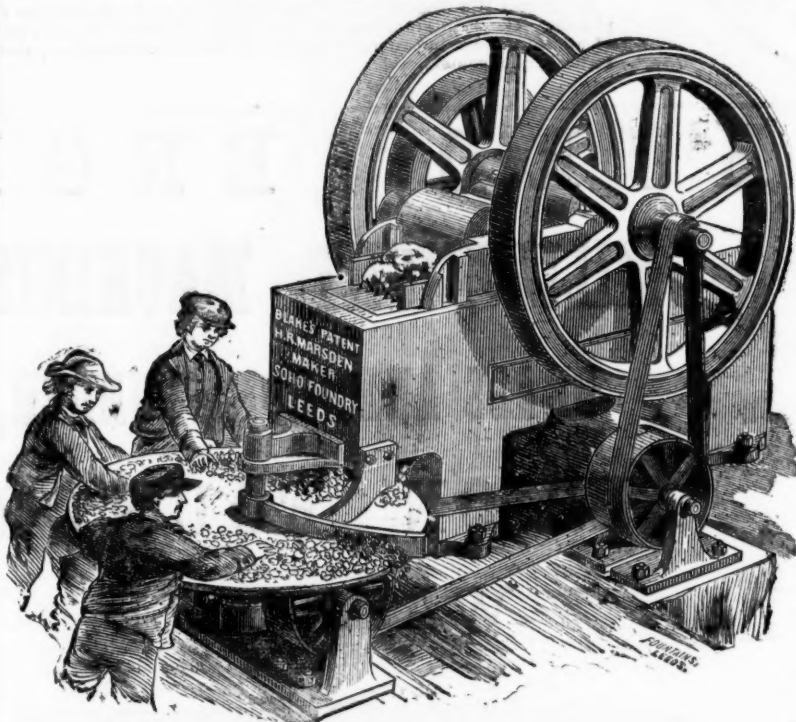
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breakers in use during the last 12 months, and
Capt. Morcom reports most favourably as to its
capabilities of crushing the materials to the re-
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The Van Mining Company (Limited), Van
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crusher every 24 hours. I may say, of all our
machinery, that for simplicity of construction
and dispatch in their work, they are equal to any-
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surpasses them all.
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Chacewater, Cornwall, Jan. 27, 1869.—I have
great pleasure in stating that the patent stone
breaker I bought of you some three years ago
for mines in Chili, continues to do its work well,
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size by horse power—with great ease. I can
safely recommend it to all in want of a crusher;
can be driven by steam, water, or horse power.
H. R. Marsden, Esq. JAMES PHILLIPS.

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mouthful of oats. On every 100 tons of the rock
crushed by the machine there is a direct saving to
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and the indirect saving much more, the machine
being ever ready to perform the duties required
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form so fitted for the stamps, that they will pul-
verise one-third more in a given time than when
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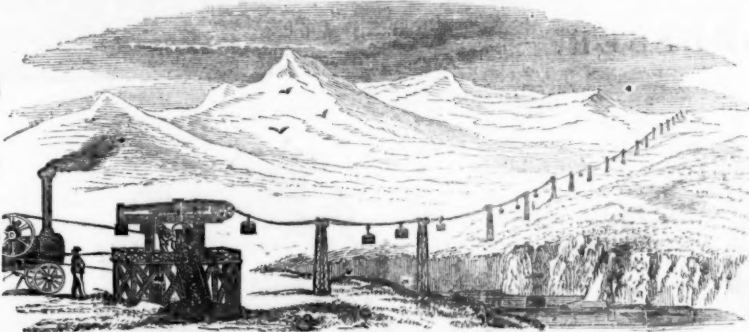
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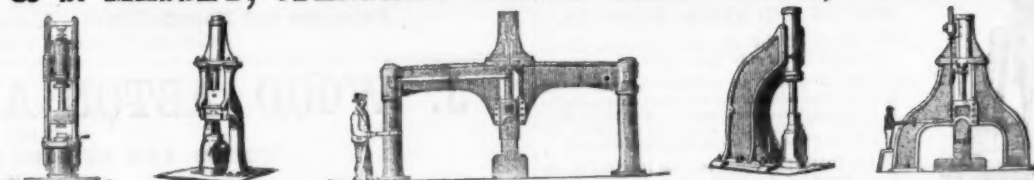
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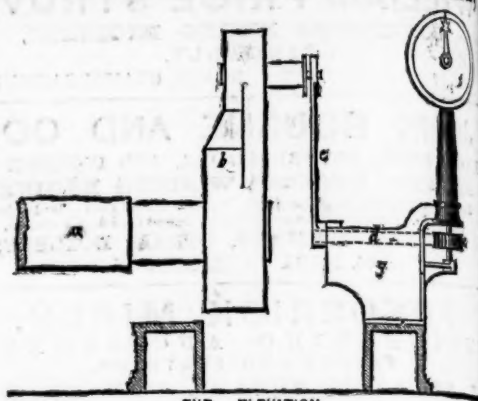


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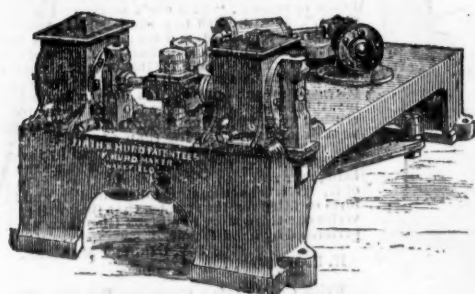
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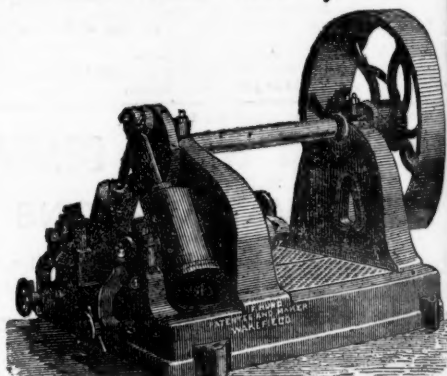


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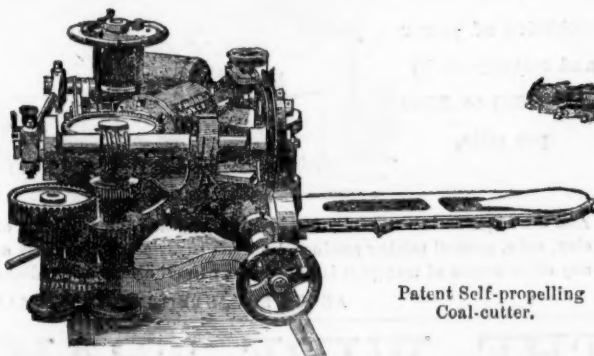


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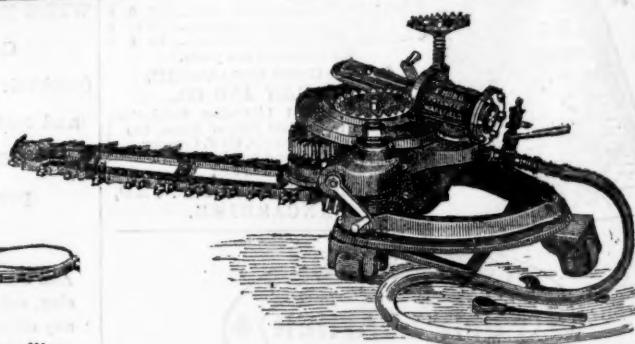


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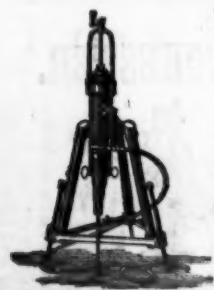


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FORKS, ANVILS, VICES, SCYTHES, HAY and CHAFF KNIVES, PICKS, HAMMERS, NAILS,
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THE MINING JOURNAL,

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FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

EXTRACTS FROM DICKER'S "AUSTRALIAN & LONDON GAZETTE."

LONDON, SATURDAY, MAY 18, 1872.

GOLD AND THE GOLD-FIELDS.

THE reports which have been received from the various gold-fields of the colony during the past month do not contain any particularly special announcements, but they are, on the whole, very satisfactory. Alluvial mining is being steadily pursued in the different districts with advantageous results, and quartz mining is increasing in a rapid and most profitable manner on several of the older gold-fields, especially in the Bendigo or Sandhurst district. The prospects of this latter district indeed appear more and more brilliant month by month; for in addition to the continued richness of the older reefs there, the striking of a new reef or reefs is reported almost weekly. It is now undoubtedly the best quartz mining district in the world, and it also seems, from the many new discoveries which are made, that it has quartz reefs running in all directions through it, which will soon furnish profitable work for a vast number of miners. The splendid yield from many of its mines have led to a very healthy desire on the part of capitalists and other persons who have more or less spare cash at their disposal to invest in prospective mines in the district, and a large amount of money is now being laid out in the sinking and development of such mines. The Great Extended Hustler's Tribute Mine, which, since the reef was struck in it in October last, has yielded almost fabulous returns, still proves very rich, though the last two fortnightly returns are not so high as those of several previous fortnights were. The yield for the fortnight ending Saturday, March 23, was 2277 oz., and that for the previous fortnight 2936 oz. The Great Extended Hustler's Company are also raising good stone. Their shares have now become very valuable in the market, and have advanced during the last month at a rate which must be exceedingly pleasing to the fortunate holders of them. On the 1st of this month they were quoted at 7½ 5s., from which price they gradually rose until, on the 26th inst., they were sold as high as 10½ 5s. The Sandhurst correspondent, in *The Argus*, of the 26th inst., in speaking of this company and its tribute company, says:—"Great Extended Hustler's have still further advanced, and in request, but firmly held. This claim may justly be entitled the 'Investment Company' of the district—a feeling existing that money cannot be placed in any company more safely; and when speculation in others fails, these shares are always wanted, and are considered just as safe and valuable as 10½ bank notes. They report a great improvement in the yield of amalgam (about 1000 oz.) for the past week, and will have much better returns. The fine yields of the Tribute also strengthen the company when it is known that this run is not yet touched in the parent claim which it adjoins."

From Ballarat several items of news of importance have been recorded during the past week. One of these was the good finds of gold made by the tributors of the Black Hill Company. They obtained as much as 89 oz. of gold from one bucketful of quartz stone, taken from a small flat leader; and the ground in that part of the claim which it was got from continues to give promise of yielding rich stone. Two or three new claims have already been taken up on the Black Hill reefs in consequence of the good prospects of the Black Hill Company. The improved and still improving aspect of the New Homeward-bound claim at Scotchman's, in the Ballarat district, has also induced a number of claims to be taken up around it. It is also hoped by the shareholders of another claim—the Sovereign—that a reef which has been found in their shaft will prove to be a payable main lode, and if that be so, a great impetus will be given to quartz-mining in the district. Hitherto Ballarat has been noted for its enormous yields from alluvial mines, but many of the old residents of the district have held to the theory that it would yet prove equally rich in quartz-bearing stone, and as time progresses discoveries of reefs are made which give fair foundations for the belief that the theory will be verified in fact. The Gravel Pits Company, which was one of the first of a number recently started to work the old rich ground under the town of Ballarat East, formerly supposed to have been wholly worked out, had their first washing up last Saturday, and the result was satisfactory beyond all expectation. It was predicted that from the first three machinefuls of dirt which the company put through the puddling process, not more than 15 oz. of gold would be returned, but the handsome yield of 60 oz. 15 dwt. was obtained.

The *Ovens Spectator*, in a recent issue, points out that the mining resources of the colony are yet only very partially known, and still more partially developed. The journal says:—"It has been found that old reefs have been abandoned without cause, and new ones of surpassing richness are discovered almost every day. Here in this district we have a remarkable instance of the latter. Mr. Magill, a miner with a perseverance rarely to be met with, for over six years prospected the country about Hillsborough, but in vain. Reduced to his last shilling, but not despairing, he one lucky morning puts in a cut on a spot over which miners had walked a thousand times to the adjacent reefs, and here he finds, within 6 inches of the surface, a fortune. This reef is now down 120 feet. It has yielded as much as 7 oz. to the ton, and some of the richest stone we have ever seen, from the last shot in the shaft, at the depth named, is now in view at the Post-office Hotel, Beechworth. But what in the way of developing the reefs can be accomplished by a few

men in so rugged and extensive a country? Or, how can it be said that our mines are failing when there are probably not two dozen men systematically prospecting the thousands of square miles of auriferous country which lies between the Buckland and the Murray, and El Dorado and Forest-hill?"

The gold-mining statistics of the colony for the quarter ending 31st December last, which were published during the past month by the Department of Mines, show that there are now 58,279 miners employed on different gold-fields, of whom 26,160 were Europeans, and 15,582 engaged in alluvial mining; and 16,450 Europeans and 87 Chinese in quartz-mining. The total mining population was divided in the various districts as follows:—Ballarat, 13,892; Beechworth, 8119; Sandhurst, 8258; Maryborough, 12,046; Castlemaine, 9137; Ararat, 3161; and Gipps Land, 3096. The approximate value of mining plant in the colony was 2,060,885£. The number of square miles of auriferous ground worked upon was 984½, divided amongst the districts as follows:—Ballarat, 134½; Beechworth, 248½; Sandhurst, 140½; Maryborough, 77½; Castlemaine, 166½; Ararat, 82½; and Gipps Land, 135. The quartz reefs distinctly proved to be auriferous amounted to 3130, of which 189 were credited to Ballarat, 779 to Beechworth, 710 to Sandhurst, 524 to Maryborough, 390 to Castlemaine, 73 to Ararat, and 465 to Gipps Land. The amount of gold obtained during the quarter, as estimated by the Government mining surveyors and registrars from such information as they could obtain from gold buyers and others, was 352,698 oz., of which 178,336 oz. was from the alluvial mines, and 174,362 oz. from quartz mining. Information was given respecting 227,245 tons of quartz, respecting which the surveyors and registrars had positive statistics, and it appears that 78,502 tons of the quartz mentioned were crushed in the Ballarat district, with a yield of 22,798 oz. gold, 26,260 tons in Beechworth district for a return of 13,649 oz., 38,210 in Sandhurst district for 22,333 oz., 11,661 in Maryborough district for 6503 oz., 33,974 in Castlemaine district for 15,578 oz., 26,909 in Ararat district for 21,877 oz., and 11,728 tons in Gipps Land district for 14,680 oz. The average yields in the various districts were as follows:—Ballarat, 5 dwt. 19.42 gr. per ton of quartz; Beechworth, 10 dwt. 9.50 gr.; Sandhurst, 11 dwt. 16.55 gr.; Maryborough, 11 dwt. 3.70 gr.; Castlemaine, 9 dwt. 4.10 gr.; Ararat, 16 dwt. 6.24 gr.; Gipps Land, 1 oz., 5 dwt. 0.7 gr. Out of 33,691 tons of quartz tailings, cement, and mullock operated on, 5789 oz. of gold was obtained, and from 906 tons of pyrites and blanketing 2580 oz. of gold was taken. The depth at which gold is being extracted from quartz claims continue to increase. In the New North Clunes claim at Clunes it has been got at from

EXTRACTS FROM DICKER'S AUSTRALIAN AND LONDON GAZETTE.

240 feet to 790 feet; at Learmonth's claim, Egerton, at from 400 feet to 500 feet; at the New Chum reef, Sandhurst, at 525 feet; at Hustler's reef, Sandhurst, at 600 feet; at the South Nuggetty reef, Sandhurst, at 550 feet; at the Cross reef, Pleasant Creek, at 620 feet; and at Good Hope Company, Crooked River, at 620 feet.

At a dinner given by the shareholders of the New North Clunes Company, which is one of the most prosperous companies in the colony, on the 16th March, some very interesting facts were stated respecting that company, showing the vicissitudes which it had undergone before it attained to its present prosperous condition. The health of Mr. James Esmond was proposed, and in returning thanks, Mr. Esmond said that "in July, 1851, he made the first gold discovery at Clunes; the first gold cradle was made and rocked at Clunes; and he sold the first parcel of gold obtained from Victorian soil." He had also "cradled the New North Clunes Company in its birth and in its infancy, but it had fled from him in its maturity, and he was now filling the obscure post of stampsman for the company, for which, however, he was grateful, since it enabled him to find bread for his family." The recorder of the proceedings at the dinner further states, in reference to the combined subject of Mr. Esmond and the New North Clunes Company, that on the 10th March, 1854, a commission appointed to investigate claims for rewards like those of Mr. Esmond's, awarded him 1000*l.*, which was duly paid. Still another reward was given him in consideration of his gold discovery, and this took the shape of a lease of promising quartz ground at Clunes. The New North Clunes Company was formed at the end of 1857, or the beginning of 1858, to work Esmond's lease, to which it afterwards joined much neighbouring country, and from its commencement, at the date just mentioned, till August, 1868, it was a continued drag upon its proprietary. Expecting to find payable stone at a depth of 300 feet or 400 feet, the company has been obliged to sink to a depth of nearly 1000 feet, and has now the deepest shaft in the colony. Serious blunders were made in the ordering and planning of the company's machinery in the early days, and much loss accrued from this cause. Then the reef upon which the company relied in the beginning, by and by showed symptoms of exhaustion, and one thing with another made the New North Clunes mine a source of much care to its owners for many years. But after a time things took a turn for the better. Two gold-bearing reefs were discovered in its ground, of which the company was not aware when it commenced operations, and its explorations at deep levels proved more successful than there was sufficient reason to anticipate in the beginning.

As affairs stand now, all concerned have every reason to feel highly gratified, and those who have stuck to the company all through have been amply rewarded for their constancy. The paid-up capital in the company is 18*l.* per share, and 100*l.* per share has already been paid in dividends, the present value of the shares being something under 120*l.*, and its prospects, according to the views of the shareholders, brighter than ever. In illustration of the uncertainty which attends the value of Victorian mining property, it may be mentioned that at one time, when 10*l.* or 12*l.* per share had been paid up in New North Clunes shares, they were barely saleable at 30*l.* each. Subsequently, in 1869, they readily fetched 200*l.*, but in another year they were purchasable at 45*l.* To show about what the mine yields it may be said that for January of this year it paid 4*l.* per share, for February 1*l.* and for March 4*l.* 10*s.* In reflecting upon the varied career of this enterprise, it would be pleasant to know that its original projectors were sharers in its present prosperity, but this is not so, except to a limited extent. Very many of the original shareholders were obliged to sell out at a great sacrifice before the dividend-paying era commenced, and, to the same extent, the present lucky shareholders in the mine are speculators who bought in at one time or another. Two years ago the company purchased two of its own shares, then worth about 156*l.*, and presented them to Esmond's wife, so that the first discoverer of gold at Clunes does not now rely altogether upon his own labour for his means of living. The history of the

vicissitudes of the New North Clunes Company and its ultimate success would apply to very many of our now most prosperous colonial mines, numbers of which had to be worked for years at great expense and under considerable difficulties before they were successful enough to pay dividends.

AUSTRALIAN MINES.

Two Australian mines are just now before the public; one of them, the London and St. Arnaud, for working Gold and Silver; and the other, the North Costerfield, for working Gold and Antimony. Both these properties are very extensive, and the best evidence that could be had of the good faith of the vendors is to be found in these two facts—although the property is very rich, the valuation is moderate, and the purchase-money is taken in shares. The views and plan which accompany the prospectus indicate unmistakably the extensive character of the St. Arnaud property, and certificates from Messrs. Johnson and Matthey, the well-known refiners of Hatton Garden, prove that the lodes are rich in gold and silver. The plant and machinery, indeed, require but few additions to render the mine, which is a mile in extent, one of the most productive in Australia. The Costerfield lode, which yields gold as well, is reported to be the *finest Antimony lode in the world*; and the ore, without any dressing whatever, finds a ready sale in this market at 15*l.* per ton. The marked success which has attended mining in Victoria is perhaps best expressed in the fact that the monthly dividends from quartz mines have, within two years, had an increase steadily upward from about 25,000*l.* per month, to the present average of from 50,000*l.* to 90,000*l.* These figures speak for themselves. It is satisfactory to note that mines long in work hold their places amongst the more recently discovered, and the deeper the miners go, the richer, as a rule, do they find the quartz. For instance, the Hustler's Tribute Mine was sold some years since for 160*l.*, afterwards for 900*l.*, then for 3000*l.*, each party in succession making large profits from the mine; and yet within three months of the last mail leaving Australia, the mine had paid over 80,000*l.* in dividends, out of the deepest portion yet reached. This is but one out of numerous similar instances, perhaps not quite so remarkable; many of them, however, are far on in the same direction, and quite sufficient to establish for Victorian mines, when properly worked, a general character for permanent richness.

VICTORIA WATER SUPPLY.

AWAITING the arrival of Mr. Gordon, the new engineer-in-chief, the waterworks of the colony remain at a standstill. The temporary repairs to the Malmesbury reservoir have been all but completed, and pipes have been laid in the township of Castlemaine, which can be supplied from local reservoirs, but nothing of greater importance has been attempted. The Minister of Mines and Lands recently paid a visit to the works at Castlemaine, and found the Expedition Pass reservoir, which is principally relied on to furnish that town with a temporary water supply, in a rather unsatisfactory state. Filtered beds seemed to be urgently required, and likewise some means of arresting a wholesale process of silting up. The reticulation of Castlemaine was found to have been executed with defective pipes, and there was great reason to fear that there had been no previous testing of the smaller pipes. Nothing, however, will be done to the reservoir until Mr. Gordon has reported upon the works. By local effort, a waterworks scheme has been carried out at Clunes. The enterprise has been managed by a commission, of which Mr. Peter Lalor is the chairman, and the works were opened about a fortnight ago. The scheme consists of a storage reservoir for two hundred million gallons at the head of the Bullarook Creek, nineteen miles from the town; ten miles lower down a weir, which backs up some two millions and a half of gallons; an aqueduct one mile and a half long, and a pipe track of six and one-eighth miles. All except the storage reservoir is finished. The capacity of the works is from two to three millions gallons per twenty-four hours. Owing to a disagreement between the borough and the commission, the townspeople do not yet participate in the benefits of the supply, and water is only laid on to the principal mines. When completed the scheme will cost from 50,000*l.* to 60,000*l.*; up to the present it has cost 35,000*l.*

VICTORIA—NEW LINES OF RAILWAY.

PROGRESS is being made with our railways. The North-Eastern line as far as Kilmore is ready for use, and was to have been opened on Easter Monday, but as will be the rolling-stock at command will be required on that day for the traffic on the other lines, the event has been deferred. With regard to the new railways authorized by Parliament last session, it has been officially notified that tenders for the works of the first fourteen miles or thereabouts of the following lines—namely, Castlemaine to Maryborough and

Dunolly, and Ballarat to Ararat—will be called for on or about the 30th April next. Separate tenders for the 5 feet 3 inches and 3 feet 6 inches gauges will be taken for each line. Another line, which is to be constructed by private enterprise, is also to be undertaken. Plans and sections of a railway from Portland to Coleraine, with a branch to Hamilton and another to Casterton, have been deposited with the clerk of the Legislative Assembly, the Board of Land and Works, and at the offices of the shires and boroughs interested in the line. The railway is to be constructed on a gauge of 3 feet 6 inches, and is to be worked by rolling-stock on the Fairlie system. It is undertaken by a company, composed entirely of residents in the districts it passes through. The Government intends to give a concession of land to the company, at the rate of one acre for every 2*l.* expended, and a proclamation has been issued reserving from sale land to the extent of 163,392 acres.

MAIL CONTRACT—SAN FRANCISCO TO MELBOURNE.

MR. VOGEL, C.M.G., the representative of the New Zealand Government, and Mr. W. H. Webb, the American steamship proprietor, have been in Melbourne during the last few weeks, and after some negotiation an arrangement has been come to by which the Victorian Government will grant a subsidy towards the maintenance of a mail *via* San Francisco and New Zealand. A contract has been entered into and signed, but the particulars are not to be divulged until the meeting of Parliament. It is known, however, that the American steamers are to come on direct from New Zealand to Melbourne, and the subsidy is reported to be between 15,000*l.* and 20,000*l.* per annum, though there is reason to believe that the amount is something very different. In recognition of the exertions Mr. Webb has made to bring about steam postal communication between the Australian colonies and California, he was entertained by the Melbourne merchants at a banquet at Scott's hotel. Mr. George Stevenson, President of the Chamber of Commerce, occupied the chair. Amongst those present was the Minister of Public Works, who, in replying to the toast of the Ministry, expressed his confident belief that the arrangements which had been entered into would meet the acceptance of the Parliament and the people, because they had been entered into in a friendly spirit, and with a sincere and anxious desire to establish the friendliest possible relations not only with New Zealand, but with the United States of America. Mr. Webb, in acknowledging the toast of his health, described the various steps which had been taken from time to time to establish a system of steam and postal communication between the two countries, and appeared, from the nature of the remarks which fell from him, to be fully aware of the importance of making Melbourne the port of departure for his steamers.

AUSTRALIAN TELEGRAPH, FROM ADELAIDE TO PORT DARWIN.

FOR the last two or three months the public have been greatly misled by reports as to the time when the overland telegraph wire would likely be opened. It was to have been finished in February last. Now we hear that it can scarcely be ready before the end of July. On the 16th December last there were 392 miles of uncompleted line between the northern end of section E, and a section 226 miles in length running southwards from Port Darwin. Of these 392 miles, about 140 miles, in continuation of the 226, were in the hands of two construction parties, who were going ahead at the rate of from three to four miles a week. One was to finish by the end of March, the other in June. To meet them, a third construction party had commenced to pole northwards from section E, and by the 20th December had accomplished 50 miles. This left 200 miles unaccounted for, in December, between the outmost point reached by the southern party and the Daly Waters where the second northern party ended. On December 20, Mr. Burton, in charge of a party appointed to begin at Daly Waters and work southwards, was 45 miles distant from the point where he was to begin. Wet weather had seriously delayed his teams, but it is believed he was on the ground by the end of January. If he has made fair progress he ought to have finished 20 miles by this time. Taking it for granted that the speed will be increased as the weather improves, and that the party who are to finish in March will move down to help Mr. Burton, then it is calculated that the whole of the work will be finished in July.

As regards the horse-express which is to be established in the meantime over the unfinished work, there are 300 miles of country to traverse. Mr. King was to leave the Roper River before the close of February, and ought to have got his service organized by the third week in April; but to speculate when messages will come through would only mislead people. Communications from Mr. Todd, the general superintendent of telegraphs, were received up to February 26. From his accounts the Roper must be a splendid river. The S.S. *Omeo* ascended 100 miles. The stream was navigable for that distance by vessels drawing 14 ft. water. Telegrams can now be sent daily from Port Augusta to Tennant's Creek, northern end of section E, a distance of 170 miles into the interior. The blacks have been mischievous in one place. They have carried off insulators and pulled down wires. Mr. A. G. Burt, in a journey down the line, encountered two mobs, but was able to ward off attack. A vast fresh-water lake was discovered west of Ashburton Range. Northward of the settled districts, abundance of luxuriantly grassed country was traversed. Everywhere, during the late midsummer season, the rains have been heavy. Three months of floods a short time back, and the stoppage of northern works, during the favourable season of 1871, owing to disputes with contractors, have been put down as the cause of the whole delay.

EXTRACTS FROM DICKER'S AUSTRALIAN AND LONDON GAZETTE.

The North Costerfield Gold and Antimony Mining Company. No Liability. Costerfield, near Bendigo, Victoria, Australia.

Capital 50,000*l.* in 50,000 Shares of 1*l.* each.
Paid up 10*s.* per Share, viz. :—
20,000 Shares of 1*l.* each, 10*s.* per Share paid,
= 10,000*l.* allotted in the Colony.
30,000 Shares of 1*l.* each, 10*s.* per Share paid,
= 15,000*l.* to be allotted in England.

50,000 Shares. 25,000*l.* called up.

The London Agent has instructions to offer the above parcel of 30,000 Shares :—

2*s.* 6*d.* per Share to be paid on Application ;
2*s.* 6*d.* on Allotment ; and 5*s.* in Three Months after Allotment. The Balance, if required, in Calls not exceeding 1*s.* per Share per month.

It is estimated, however, that 10*s.* per Share will be quite sufficient for all purposes of the undertaking.

Directors in the Colony.

Robert Burrowes, Esq., M.L.A., Member of the Legislative Assembly for Sandhurst, Bendigo.
Thomson Moore, Esq., M.L.A., Member of the Legislative Assembly for Mandurang, Bendigo.
Samuel P. Lord, Esq., J.P., Melbourne.
D.A. Osborne, Esq., Melbourne.
Dr. Fitzgerald, Melbourne.
William Gardiner Sprigg, Esq., Melbourne.

Directors in England.

Geo. A. Addison, Esq., 17, Charles Street, St. James's.
W. C. L'Estrange, Esq., Queen's Hotel, Norwood, and 17, Merrion Square South, Dublin.
Henry Small, Esq., Junior Carlton Club, Pall Mall, and Buckingham.

Bankers in the Colony.

The Bank of Victoria, Collins Street, Melbourne.

Bankers in London.

The London and South Western Bank, Limited, 7, Fenchurch Street, E.C., London, and its Branches.

The Scrip, which is signed and sealed, ready for issue, is deposited meanwhile, for security, at the Bank of Victoria, 3, Threadneedle Street, London, E.C.

Secretary.

William Scott, Esq., 37, Market Square, Melbourne.

London Agent.

Thomas Dicker, Esq. (formerly Editor and Proprietor of *Dicker's Mining Record*, Melbourne.)

Offices.

4, Royal Exchange Avenue, London, E.C.

The object of this Company is to work the extensive property known as the North Costerfield Mine,

for both gold and antimony. Its area is 25 acres 2 roods and 4 perches, with a length on the course of the lode of 1613 feet.

The Mine adjoins the well-known Costerfield property. The lode runs between solid and well-defined walls, without fault or break, and bears the reputation of being the finest Antimony lode in the world.—*Vide* Report of J. Brache, Esq., Civil and Mining Engineer, late Superintendent of Mining Surveys to the Geological Department, Melbourne.

An inspection of the accompanying carefully executed plan will be sufficient to show the extreme value of the property.

The Report of Mr. D. L. Strong, the Government Mining Surveyor, at Heathcote, states that "the whole of the underground works now being prosecuted by the Costerfield Company are at the north end of their ground, and therefore contiguous to the North Costerfield property."

The extension of the levels made during the last three months, and drawn on the plan, shows how rapidly the Costerfield Company's works are approaching the boundary separating it from the North Costerfield Mine. In fact, at the same speed, it is a mere question of two or three months.

Thus, abutting on the North Costerfield boundary, the adjoining mine is working profitably on ore at 180 feet and 420 feet, and the lode still as well-defined and productive as ever, is followed down to 500 feet, giving stopes between these levels, which will probably occupy the North Costerfield Company for years.

With respect to the Costerfield Company's working, mining operations, owing to insufficient appliances, are conducted on a limited scale. Yet, notwithstanding, similar returns would give the North Costerfield Company from 50 to 100 per cent. upon the proposed paid-up capital.

It is intended to sink a large main shaft to cut the lode at a depth of 600 feet, and provide efficient machinery. But as the lode rises to within a few feet of the surface, a whim shaft will meanwhile be sunk to intersect the lode at 200 feet, so that ore can be raised, dressed, and shipped to England, and returns be had in the course of a few months.

The vendors sell their interest to the Company for 11,500*l.*, viz., 20,000 shares of the Company, paid up to 10*s.* per share (already commuted), and 1500*l.* cash.

This Company is registered in Melbourne under the "No Liability" clause of the "Limited Liability" Act of the Colony of Victoria, which limits the amount to be called up to 1*l.* per Share.

Extract from Report, by J. BRACHE, Civil and Mining Engineer (late Superintendent of Mining Surveys to the Geological Department).

"The area of the lease ground is about 25½ acres, forming a parallelogram 690 feet wide (east and west), and 1614 feet in length (north and south), with the bearing of the antimony lode as defined in the workings of the Costerfield Gold and Antimony Company's Mine. The lease adjoins that of the Costerfield Company's on the north, and is distant about 450 feet from the main shaft of the latter company.

"The mineral character of the surface is the same as

that of the celebrated Costerfield Mine. The cap of the antimony lode is distinctly defined along the surface, and some half dozen prospecting shafts have been sunk, from which both oxide and sulphate antimony ores have been obtained at various depths, from 20 to 80 feet from the surface and along the outcrop of the lode. About 100 lbs. weight of antimony ore, obtained at about 20 feet from the surface, has been forwarded as a sample to your office. The lease area secures fully the eastern underlay of the antimony lode (as defined in the Costerfield Company's Mine), over 1500 in depth, or at the rate of about 2 feet per fathom.

"In order to form a still better opinion as to the mineral character of the property, I availed myself of the permission to examine the surface and underground workings of the Costerfield Mine. Although my opinion had been a good one, from the periodically reported returns and profits from this mine, I had no conception of its really magnificent proportions and prospects, until I had traversed the greater portion of the mine, and examined all the faces of the lode in the north levels, more particularly in the stopes between the 320 feet and 420 feet levels. A blind shaft sunk 80 feet from the 420 feet level has proved the lode down to 500 feet, continuing the same regular underlay of about 2 feet per fathom. The workings in some of the north levels of the mine extend to within 200 feet of the southern boundary of the North Costerfield Company's lease. The lode in these levels rises with the surface of the ground towards the north into your property, and it is my belief that the apex of the lode will be found within your lease, and it is not improbable, should this be confirmed by subsequent workings, the lode will develop proportions within your lease even beyond those now met with in the Costerfield Mine. The average thickness of the antimony lode in the Costerfield Mine may be set down at no less than 3 feet. It runs between solid and well-defined walls, without fault or break, and bears the reputation of being the finest antimony lode in the world.

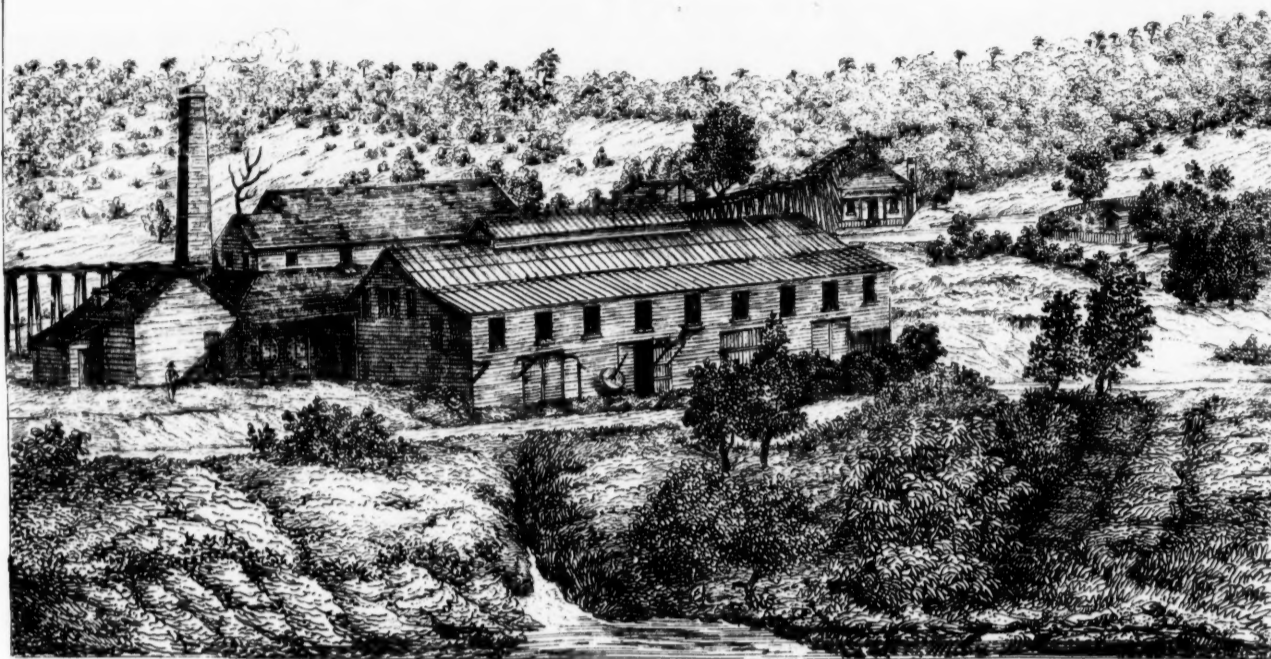
"This mine has yielded about 4000 tons of antimony ore, which at the average price of 15*l.* per ton gives 60,000*l.* The gold quartz crushed from the mine yielded also large returns, particulars of which I could not obtain. Out of this amount 20,200*l.* have been paid in dividends, besides purchase of plant and an accumulated reserve fund. The extent of the lode opened up permits of four times the number of men being employed with proportionate returns, but this could not be effected without a proportionate enlargement of shaft and machinery. The mine is well-drained, and timbered, and ventilated, and as the lode is dipping south, the North Costerfield Company's Mine will greatly profit by this drainage. It is well known that the antimony ores are more or less rich in gold and silver, but as the extraction of the gold is at present monopolized by an English company, the Costerfield Company has only realized on the average value of the antimony ores, irrespective of the per-centage of gold they contain.

"The inspection of the North Costerfield Company's property leaves no doubt on my mind that the lode as now traced so near the boundary is continuous throughout its length, and I look upon the undertaking as legitimate, and almost free from speculative uncertainty, and therefore do not hesitate in giving it my unqualified support.

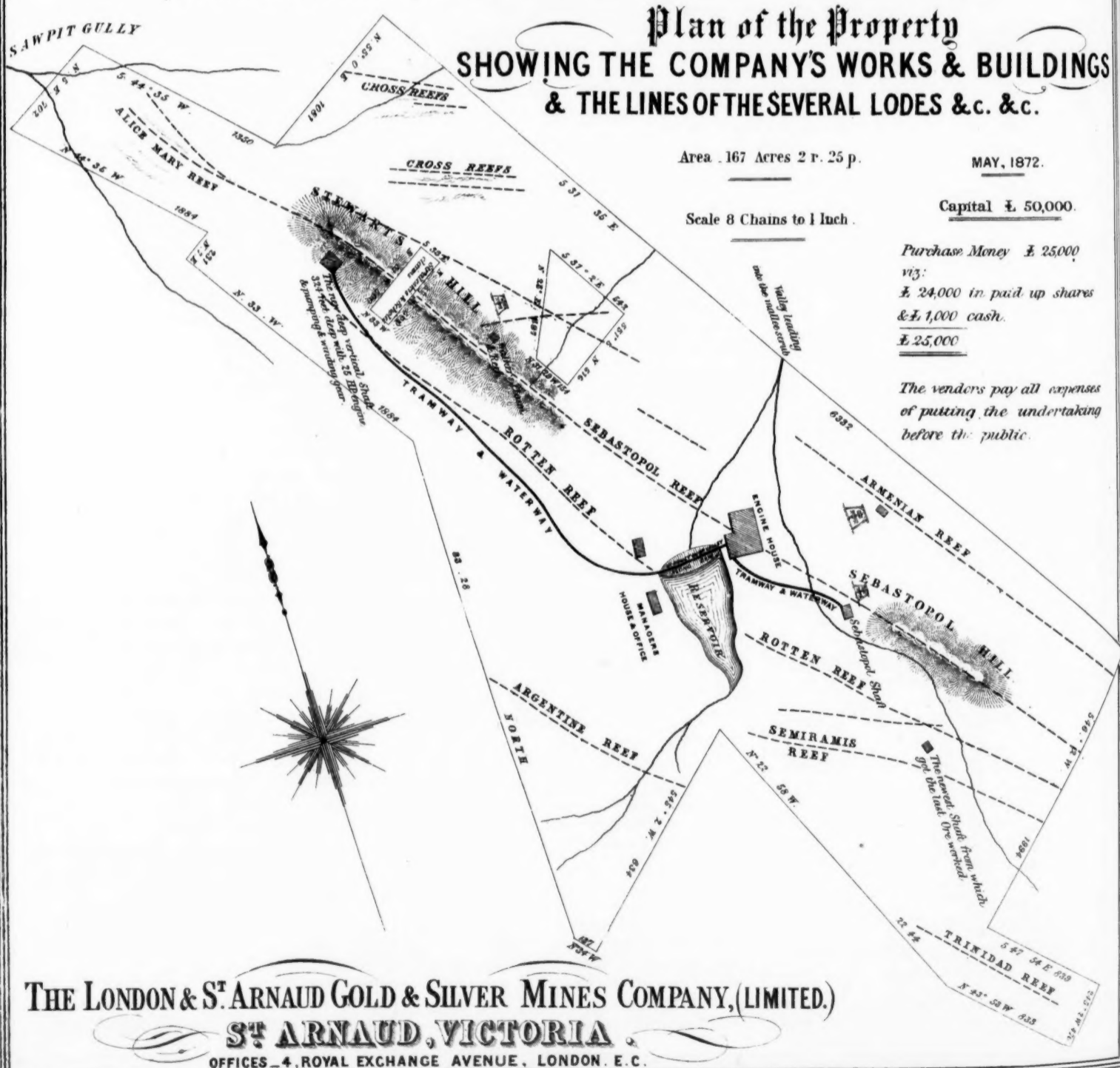
"Timber, both for mine works, erection of machinery, and firewood of the most excellent quality, and in great abundance in the immediate vicinity, will be procurable for years to come, and is now 30 per cent. under Sandhurst prices."

Plans and prospectuses with the fullest information may be had, and samples of ore taken from both mines can be seen, upon application to the London Agent (who has personally inspected the lode), 4, Royal Exchange Avenue, London, E.C.

EXTRACTS FROM DICKER'S AUSTRALIAN AND LONDON GAZETTE.



VIEW OF THE REDUCTION WORKS & MILLS FROM THE EAST WITH TRAMWAY ON THE RIGHT LEADING TO THE STEWART'S HILL MINES.



NO. 2 SERIES.

The New Zealand papers to hand are singularly bare of mining news this month. There is a great depression owing to the falling off of the Caledonian yields, but there is every probability of improvement in other mines as soon as the progressive work now going on in a number of the mines is completed. The Perfect Cure has been getting good stone, over 2 oz. to the ton, from a lode which will be the third lode to the Golden Crown and Caledonian claims. The dividends still remain at 10½. 2s. 9d.

EXTRACTS FROM DICKER'S AUSTRALIAN AND LONDON GAZETTE.

No. 3 SERIES.

As will be seen in the remarks upon No. 1 Series, no purchases have been made this month. In addition to the purchases already noted will have to be added, 500 Mariner's Reef, and 50 Winter's Freehold, new issue. These latter are in demand in the colony at a premium.

NEW ZEALAND MINES.

TOKATEA, March 19th, 1872.—This company commenced, on Monday last, to send their stone to the New Zealand Company's battery, after accumulating a stock for a fortnight.

SHOTOVER, March 19th, 1872.—A first trial crushing of stuff taken from the new country at the 384 feet level of this mine will be completed this afternoon, and, according to the amalgam in hand, is expected to yield at the rate of $\frac{1}{2}$ oz. of gold to the ton. That the yield will be high enough, even if it should be less than $\frac{1}{2}$ oz., to give a sterling character to the deep ground of this field, I have very little doubt, and also that the influence for good it will exercise upon mining here can scarcely be over-estimated. The trial crushing consists of 4 tons 2 cwt. of stuff which was part and parcel of some thirty tons of stuff promiscuously taken out of the last fathom or two of the shaft.

ALLUVIAL.—It is more than likely a considerable rise will take place in these shares ere very long.—*Saunders' Report.*

PRINCE IMPERIAL, March 22nd.—Fifty tons yielded 52 oz. of melted gold.

CALEDONIAN, March 22nd.—A discovery was made of richer stone at the time the mail left, and about half a ton of specimens was ready to be sent to the mill. But so far it was impossible to form any idea of the extent or value of the discovery. A prospecting winze is being sunk on the lode from the present lowest level.

VICTORIA MINES.

ENERGETIC, LAURISTON, March 4th.—The yield for the fortnight was 28 oz. The top stone is very patchy, and the manager recommends the letting of a contract to drive north, at the 195 feet level, where he knows there is a good strike of stone in the backs.

CENTRAL ENERGETIC, LAURISTON, March 4.—The yield for the fortnight was 35 oz. from 4 stampings. The stopes are in good working order, and for the future the manager will be able to keep the whole of the batteries employed, four of which he will use for the purpose of taking a trial crushing from the eastern reef.

COLLMANN AND TACCHI'S REEF COMPANY, March 11, 1872.—The cleaning off on Saturday, 2nd instant, resulted in a yield of 450 oz. amalgam, being a large increase on late yields; we retorted on the same day. Yields for the month, 495 oz. gold. In stopping south of the winze a new body of stone was met with going off from the reef into the western wall. This stone has been worked already to a distance of 10 feet from the reef, and so far has proved an extensive payable body. The stopes throughout show much better this fortnight. In our prospecting drive to the east, 180 feet from main level, we have come upon a decided change of ground, and cut a most promising run of quartz bearing a large quantity of mundic.

March 25, 1872.—The cleaning off on Saturday, 16th instant, resulted in a yield of 394 oz. of amalgam for the fortnight's crushing. The stopes and spurs are looking first-rate, and an increased yield is expected for a considerable time to come. We have got the north block in the prospecting drive between Nos. 12 and 13 levels. It is a foot thick, shows gold, and there is a considerable amount of water coming from it. The shaft has been sunk a farther depth of 4 feet 9 inches.

HERCULES COMPANY, VICTORIA REEF, March 11, 1872.—During the past fortnight we have crushed 178 tons of stone, which has yielded 83 oz. of gold. The stone is looking rather better going south. The engine-shaft has been sunk 4½ feet, and the western crosscut extended 7½ feet additional.

March 25, 1872.—During the past fortnight we have crushed 315 tons of quartz, yielding 130 oz. 10 dwt. of gold. The shaft has been sunk a farther depth of 5 feet 6 inches, making a total depth of 38 feet from the plat. The drive east has been extended 4 feet 6 inches. The general appearance of the mine is better than at the time of my last report.

VICTORIA REEF GOLD MINES, March 11, 1872.—During the last fortnight we have crushed 563 loads, yielding 200 oz. 10 dwt. retorted gold. The shaft has been sunk a further depth of 5 feet, making a total depth of 568 feet. We have cut several spurs in sinking. The east crosscut at the 480 feet level has been extended 4 feet, making 141 feet east of the shaft.

March 11th, 1872.—The past week has been a pretty lively one, so far as the market is concerned, a good few stocks having almost doubled in price, particularly on the Shenandoah or New Chum line. Public attention for a week or two past has been almost wholly given to the Shenandoah line. It will no doubt soon be attracted elsewhere, perhaps to the southern claims on the line. So far as mining events are concerned there is not much to notice. The Eureka Tribute have begun crushing, and their amalgam on Saturday night was fair. The stone in the mine looks well, and they will now be enabled to crush continually. The Golden Fleece Tribute No. 3 has had a very satisfactory trial crushing. A great deal cannot be expected from the Golden Fleece Tributes until the machinery has been put up, which will not be long. The only event of note on the Hustler's line has been the striking of the reef by the Latham and Watson's Tribute No. 1. This company promises to become one of note. The South New Moon, Eaglehawk, have begun crushing, and are likely to soon pay dividends.

March 25, 1872.—Since last report we have crushed 532 tons, yielding 167 oz. 1 dwt. retorted gold. Shaft sunk

3 feet. Total depth, 570 feet; ground hard. Shall now cut plat, leaving 10 feet for a well. East crosscut 480 feet; level extended 6 feet. Total length of drive 147 feet. Dividend of 1s. per share has been declared, payable on the 26th.

March 25th, 1872.—The present aspect of affairs in Sandhurst never presented so favourable an appearance, whether viewed from the standpoint of the market, or of mining pure and simple. The present time may be said to be one of the best that we have had in regard to the market. It is true that there is none of that extraordinary excitement which existed some months ago, but business is upon a much better status, and there is plenty to do for every one, and that in legitimate transactions. The stock dealt in is so good and has such excellent prospects, that a serious loss cannot result to those generally unfortunate people the "last in." When a mine is a good one, there can be no loss in the end. Where the loss occurs, and where the public are disgusted and turned away from speculation, is where the stock has no permanent basis, and its price lives only on the fickle breath of those who "rigged" it to serve their own ends. Fortunately our principal mining speculators hardly ever turn their attention to stock of that description, their reputation for sound judgment being at stake. During the week there has been a very good business in a variety of stocks. The New Chum and Belle Vue Railway Reserve has had the greatest attention, owing to their having begun to open out on the stone, which shows gold well, and the almost certainty that there will be dividends before the end of next month. Few companies began existence with such prospects as the New Chum and Belle Vue Railway Reserve. The Shenandoah Company have also had good attention, owing to their having struck the stone so successfully worked by their tribute. The prospects of this claim are first-class. Attention has been gradually drawn south on the line also, and the Eureka, Equity, New Chum, and Belle Vue Freehold Tribute, South Belle Vue, &c., have all had a little business. Next to the claims mentioned, the Lazarus had the greatest support, and rose to a pretty high figure, about 62s., but the cake of nearly 800 oz. disappointed people strange to say. The time was when such a cake would be thought a prodigy, and that not so long ago either, but now people appear to be becoming more and more inordinate in their expectations. Shortly, unless a claim sends in 4000 oz. to 5000 oz., it will be looked upon as only an outsider. Tambora yields alone can satisfy most people now. There has been a good deal of business in other stocks, but no rises of any great importance. Looking upon the mining aspects of matters, great satisfaction must be evinced. The only drawback is the great weight of the calls, which are beyond doubt pressing very heavily upon many shareholders. In many cases, however, there is no doubt but that results must soon follow, while a great number of claims, which were only started at the time of the rush "to sell," and have proved a "sell" to the proprietors, must be given up for awhile, until people are enabled to gather a little more money. To such a fate many of these must come at last. All our principal reefs show every sign of progress at the present time. On the Hustler's reef, the greatest of them all, the Extended Hustler's is again coming to the front, they having 1000 oz. of amalgam on Saturday, so that probably they will have about 1000 oz. for the fortnight. The reason of this is that they have been enabled to at last get on the good stone. What the Extended Hustler's will eventually send in when they get the tribute stone it is impossible to imagine. Between the two reefs they should send in returns almost fabulous. The Extended Hustler's Tribute still keep good returns, and declare excellent dividends. This fortnight they have declared 7000/., and left a balance of about 1200/. These wonderful claims will no doubt long continue to send in good returns to keep up the district.—*Bendigo Advertiser.*

AUSTRALIAN & NEW ZEALAND DIVIDEND GOLD MINES INVESTMENT CO. (Limited).

No. 1, No. 2, and No. 3 SERIES.

Shares can be obtained in each of No. 1 and No. 2 Series at 5s. premium. Apply at 4, Royal Exchange Avenue, E.C.

No. 3 SERIES.—A small balance of these Shares to be had at par.

AUSTRALIAN AND NEW ZEALAND DIVIDEND PAYING AND PROGRESSIVE MINES.—

Full and reliable information, with list of sound mines for investment, may be obtained on application to Thomas Dicker (late Editor and Proprietor of "Mining Record," Melbourne), 4, Royal Exchange Avenue, London, E.C.

PROSPECTUSES, PLANS, AND VIEWS ARE NOW READY OF

The London and St. Arnaud Gold and Silver Mines Company, Limited,

AND OF

The North Costerfield Gold and Antimony Mining Company, Limited.

The former is a large and most valuable property, with extensive plant, machinery, &c., &c., and contains the only Silver Mines yet discovered in the Colony of Victoria.

The Costerfield Mine, besides yielding rich gold, has the reputation of being the finest antimony lode in the world.

In the case of both these Companies, notwithstanding the proved richness of the lodes,

The whole purchase-money, with the exception of two very insignificant amounts—£1000 in the one case and £1500 in the other—is agreed to be taken in Shares of the respective Companies.

These undertakings are sound and legitimate in every respect, and in both instances speedy success may be counted upon.

OFFICES—4, ROYAL EXCHANGE AVENUE, LONDON.

DICKER'S AUSTRALIAN AND LONDON MINING AND GENERAL AGENCY.

4, ROYAL EXCHANGE AVENUE, LONDON, E.C.

List of Shares for sale in Australian and New Zealand Mines, under limited liability.

Mariner's Reef (Gold) Quartz Mining and Crushing Company.

The Winter's Freehold Gold Mining Company, Limited, Ballarat, Victoria.

Australian and New Zealand Dividend Gold Mining Investment Company, Limited, No. 1, No. 2, and No. 3 Series.

Golden Crown Gold Mining Company, Limited, Thames River, Auckland, N.Z.

The London and Thames River, N.Z., Golden Crown Company, Limited.

The Imperial Crown Gold Mining Company, Limited, Thames River, Auckland, N.Z.

Albion Gold Mining Company, Thames River, Auckland, No. 3.

May 18, 1872.]

EXTRACTS FROM DICKER'S AUSTRALIAN AND LONDON GAZETTE.

London and St. Arnaud Gold and Silver Mines Company, Limited. St. Arnaud, Victoria, Aus- tralia.

Capital 50,000*l.*, in 50,000 Shares of 1*l.* each.

24,000 Shares of 1*l.* each, fully paid, allotted to present Proprietors.

26,000 to be allotted in England.

50,000

2*s.* 6*d.* per Share to be paid on Application;
7*s.* 6*d.* on Allotment; 5*s.* in Three Months; 5*s.* in Six Months.

The control is vested in the English Shareholders.

Directors in England.

G. A. Addison, Esq., 17, Charles Street, St. James's.

William Branscombe, Esq., Herbert Lodge, 92, Pembroke Road, Clifton, near Bristol.

William C. L'Estrange, Queen's Hotel, Norwood, and 17, Merrion Square South, Dublin.

J. W. Walker, Esq., M.D., 3, Maze Hill, Greenwich, late Mayor of St. Arnaud.

(With power to add to their number.)

Directors in the Colony.

Gideon S. Lang, Esq., *Managing Director* (who will reside on the Mines).

William Cain, Esq., Railway Contractor, Melbourne.

Charles Dicker, Esq., Town Clerk, Dunolly, Victoria.

Samuel House, Esq., Merchant, Melbourne.

Consulting and Mining Engineer.

Francis Mauduit, Esq., C.E.

Bankers.

London and South Western Bank, Limited, 7, Fenchurch Street, E.C., London, and its Branches.

Auditor.

Geo. A. Rait, Ethelburga House, 71 & 72 Bishopsgate Street, E.C.

Secretary.

Thomas Dicker, Esq. (late Editor and Proprietor of *Dicker's Mining Record*, Melbourne).

Offices of the Company.

4, Royal Exchange Avenue, London, E.C.

The object of the Company is to work the St. Arnaud Mines, in the colony of Victoria, for both silver and gold.

The property, which is leased from the Crown, is 167 acres 2 roods and 25 perches in extent, and embraces four parallel lodes. The length on their course, from north to south, is a few yards short of one mile.

The sole object of the Vendors being the efficient development of these Mines, which in point of richness equal some of the most productive silver mines of America, they have agreed to accept the whole purchase-money in paid-up shares of this Company, saving a nominal amount, as hereinafter stated.

The Vendors have undertaken, for the sum of 25,000*l.*, viz., 24,000*l.* in paid-up Shares of this Company, and 1000*l.* in cash, to transfer the entire property, including the extensive plant, machinery, rolling stock, lease, &c., &c.

The Vendors pay all costs in connection with placing the undertaking upon this market.

The property is well known to and has been visited by the London Secretary.

The *chlorides* above water level were very rich, a series of assays—made by Mr. John Masters, late assayer, St. Arnaud, habitually employed by the local bank, and now of the Thames Gold Fields, New Zealand—giving in some instances as high a per-centage of silver as 12000*oz.* per ton. The *sulphurets* below water were also very rich, the lode becoming more compact and richer as it goes down. In the deep shaft at 260 feet, a seam of the lode, 4½ feet thick, averaged by assay 65 *oz.* of silver, and a large per-centage of gold. At 310 feet it was 13 feet thick, and the seam referred to had increased to a width of 6 feet, with a vein 12 inches wide, giving by assay 240 *oz.* of silver per ton.

When the Agent of the Vendors left the colony, six bags of ore (sulphurets) were picked out from the refuse mullock heap on the surface, at the mouth of the deep shaft, Stewart's Hill, which, with three bags (bromides) taken from the new shaft on Rotten Reef, Sebastopol Hill, were shipped to London. Seven of these are now lying in the West India Docks. The other two bags, taken indiscriminately, on being sent to Messrs. Johnson & Matthey, the well-known refiners, of Hatton Garden,* for assay, were found to give the following profit-showing results, viz.:—

NO. 1. LARGE LUMPS.

	Weight.		Produce.		
	cwt.	gr. lb.	oz.	dwt.	
Sulphurets taken from } below water level. }	1	0 7	gold 1 10 silver 37 0		per ton of 20 cwt.

NO. 2. SMALL PIECES.

	Weight.		Produce.		
	cwt.	gr. lb.	oz.	dwt.	
Bromides taken from } above water level. }	1	1 5	gold 2 6 silver 5 0		per ton of 20 cwt.

[It is to be remarked, these assays were not of samples, but of considerable quantities weighing over 1 cwt. each.]

NO. 3. REJECTED FROM NO. 1 AS UNFIT TO PASS THROUGH THE MILL.

	Weight.		Produce.		
	cwt.	gr. lb.	oz.	dwt.	
	0	1 1	gold 0 15 silver 19 0		per ton of 20 cwt.

An average yield equal to half the amount of the lowest assay here mentioned would more than suffice to pay back to Shareholders their whole capital yearly.

From four samples of ore taken right across a portion (10 feet in width) of the lode, at the depth of 280 feet, the following results, by assay, viz., 23 *oz.*, 58 *oz.*, 155 *oz.*, and 25 *oz.* of silver per ton of ore, with a paying per-centage of gold, were obtained by Mr. Masters.

The St. Arnaud being the only silver mines in Victoria, no one with any practical knowledge as to the treatment of the ore on a large scale could be obtained in the colony, and thus, at the beginning of mining operations, the Company failed in extracting the silver. Later on, machinery, identical with that used successfully at the Comstock Lode, Nevada, was erected. Here again, however—for reasons to be presently mentioned—only a very small portion of the silver known by assay to be contained in the ore was recovered.

* Messrs. Johnson & Matthey's certificates may be seen at the Offices of the Company. A fourth assay this last week of 3 gr. 9 lb. has given a return of 136 *oz.* of silver to the ton.

It was at length decided to send one of the proprietors to the silver camps of America, to ascertain the various modes adopted there, when it was at once seen that the character of the St. Arnaud ore differed entirely from that of the Comstock lode, which is pure, whilst the St. Arnaud is base, that is, mixed with other metals, and requires burning. These base ores they found could only be treated successfully by roasting, and that experience is corroborated by experiments that had been made in the laboratory at Melbourne. Up to the year 1870, however, there was no method known of roasting ore on a large scale, and many of the richest mines on the Pacific coast till then lay useless for the same reason as that of St. Arnaud, viz., the ore being base. The Stetefeldt furnace was then introduced. By it all such refractory ores are dealt with effectively, expeditiously, and at a small cost; and these useless mines are now amongst the most productive on the coast. Indeed, as much as 92 and 93 per cent. of the assay is commonly got at the mill at Reno, Nevada: the St. Arnaud ore was carefully examined and assayed, and found identical with some of the base ores treated there with the highest result.

Mr. John Phillips, for seven years the Government Mining Surveyor at St. Arnaud, and now Master of the School of Mines, Ballarat, who made a survey of the property, fully confirmed the high estimate formed of the property.

It is arranged for the Managing Director to return through Nevada, with the Consulting Engineer,* and proceed thence to Melbourne. Two of the patent Stetefeldt furnaces, capable of treating 200 tons weekly, would be erected, at a cost of 1000*l.* each, and returns of bullion be available from the Mines in a few weeks after beginning operations.

It is intended to carry on, uninterruptedly, the sinking of two main shafts on Sebastopol Hill and Stewart's Hill respectively (*vide* Plan and Views); and it is estimated, the treatment of 200 tons of ore per week from the deep ground will give a profit exceeding 50,000*l.* per annum. The proposed capital will be fully sufficient to open out the Mine extensively; and for that purpose alone the bulk is required, the plant and machinery being so well appointed as to need but few additions.

The *bona-fides* is shown in—

The purchase-money being paid in shares.

In the extensive property, including lease, plant, machinery, rolling stock, range of buildings, ores, &c., being handed over to the English Shareholders, and placed under their control.

In the moderate valuation placed upon the property, notwithstanding the proved richness of the lode.

As soon as sufficient capital is subscribed to erect the Stetefeldt furnaces, and open out the main shaft, the Directors will lose no time in having operations begun.

The engine shaft on Stewart's Hill, from which ore can be raised at once, is sunk to 320 feet. Besides this one, several others are down on the lode, most of which may be made presently available.

Machinery.—There are two engines on the ground, one of 40, and another of 25 horse-power; 20 head of stamps; 12 amalgamating pans, and a large amount of material, a list of which, as well as a number of photographs, can be seen at the offices of the Company. The entire plant and machinery are in efficient working order, and would, if not already erected, have to be provided. The necessary additions to the plant are simply furnaces and settling vats, which will entail only a comparatively small outlay.

Two agreements have been entered into between William Branscombe and Thomas Dicker, dated 9th May, 1872.

For Plans, Views, and Prospectuses, &c., apply to the Secretary, at the Office of the Company, 4, Royal Exchange Avenue, London, E.C.

* Mr. Mauduit for nearly twenty years has had the management of both gold and silver mines in different parts of the world—Australia, Central America, &c.

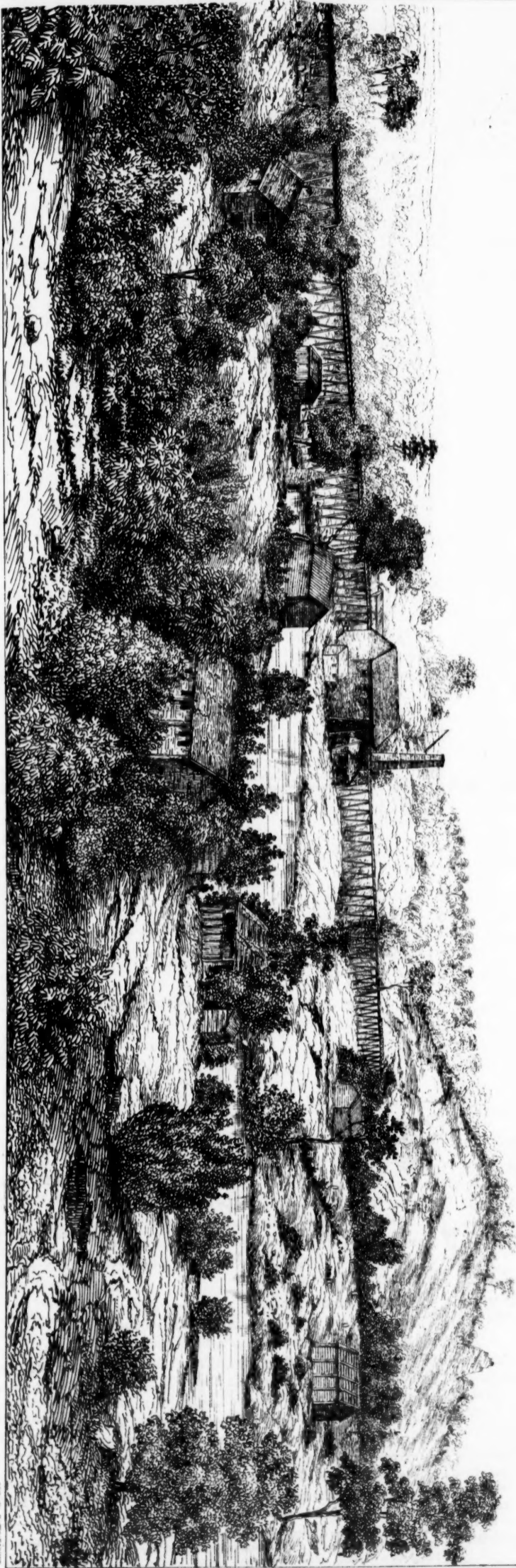
EXTRACTS FROM DICKER'S AUSTRALIAN AND LONDON GAZETTE.

The Vendors have undertaken, for the sum of £25,000, viz., £24,000 in paid-up Shares, and £1,000 in cash, to transfer the entire property, one mile in extent, including the extensive plant, machinery, rolling stock, lease, &c., &c.

THE CENTRE PORTION OF THE COMPANY'S PROPERTY LOOKING FROM THE WEST
WITH MOUNT KORONG, MOUNT MOLIAGUL & SUNDAY MORNING HILL TO THE LEFT IN THE DISTANCE.

OFFICES, 4, ROYAL EXCHANGE AVENUE.
CAPITAL, £50,000, IN SHARES OF £1 EACH.

2s. 6d. per Share on Application.
7s. 6d. " " in Three Months.
5s. " " in Six Months.
5s.



Tramway & Aqueduct leading from
the mines at Stewart's Hill
to the Mills.

Reduction Works,
Stamps House,
Blacksmith's Shop,
&c., &c.,
Reservoir.

Tramway leading from the
Sebastopol Mines to
the Mills.

Sebastopol Hill
& open cuttings.
Quartz.

JOHNSON & MATTHEY, of Hatton Garden, have made the
annexed assays from this Mine, which are not assays
of single specimens, but, as will be seen, of considerable
parcels of ore

The Vendors pay all expenses of placing the undertaking upon this market.

Weight.		Gold.		Silver.	
cwt.	qr.	lb.	oz. dwt.	oz.	
1	0	7	produce	1	10
1	1	5	"	2	6
0	3	9	"	not assayed for gold.	136
					per ton of 20 cwt.